The Development, Implementation, and Reflection of a Unit as Taught Through the Curriculum Requirements of Ball State University's Teachers College

An Honor's Thesis (HONRS 499)

by

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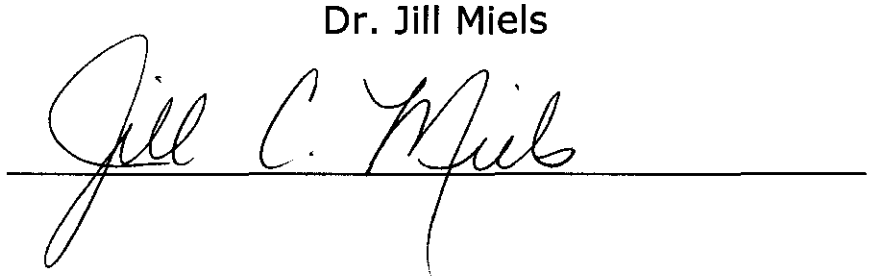

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Abby Schortgen
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Acknowledgements

We would like to thank Dr. Jill Miels for her help and support throughout this project. Her suggestions and ideas were very helpful in our success.

Abstract

This thesis project has provided us with experiences that are directly related to our future as educators. We have used the theories and methods discussed throughout our classroom experience at Ball State University to develop a unit plan. We implemented this plan in an actual classroom setting, and evaluated our teaching strategies in order to become more proficient educators.

Table of Contents

Authors' Note

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Reflection is very important in the field of education. Being able to critique strengths and weaknesses is very valuable to any professional educator because it allows for constant growth and refinement of techniques and strategies. Just as it is important to critique ones self greater insight may be gained from the perspectives of peers in the same field.

We chose to demonstrate this through the development, implementation, and reflection of a unit on the body systems. We chose to do body systems because it is a topic that may be easily adapted for other grades, and is widely covered in most school districts. We chose to base our lesson plans at the fifth grade level because it is the highest level in most elementary schools. We concluded that it would be much easier to adapt the lessons for primary grades by taking out difficult content, than it would be to add higher level concepts for upper grades. After we chose the topic and grade level, we looked at the Indiana State Academic Standards for fifth grade so that we could set our lesson objectives.

Each member of the group developed two lesson plans on specific body systems. These systems included the: Circulatory System, Digestive System, Muscular System, Nervous System, Respiratory System, and Skeletal System. Sources and materials, as well as a detailed description of how each lesson should be implemented in the classroom, were included in each lesson plan.

Upon completion of the six lesson plans, each member taught one lesson in an actual elementary school classroom. Three different grade levels were chosen for this project in order to demonstrate the adaptability of the lesson plans. Each member of the group was videotaped during the execution of their lesson. We wanted to be able to accurately reflect upon each other and ourselves therefore we felt this was the most practical way to accomplish that objective.

Each member of the group viewed the videotape in order to complete a thorough and beneficial reflection of strengths, weaknesses, and general practices. We focused on specific questions based on the requirements of the student teaching self-reflections. Those questions include: What did you do to set the mood or climate for learning? Would you do anything differently? Analyze your questions. What do you notice in terms of quality, levels, wait time, your response to students? How well did you involve all students in responding and participating? Were there equity issues? What areas to you believe you still need to improved?

We wanted to put together a collective unit that could be used by educators old and new. It seemed only logical for us to create lessons on each body system, and compile them together along with coordinating materials. In creating an entire unit, the educator will be able to show the students the connections between each system. The reflections can be used to show strengths and possible weaknesses in the content. This is important to note so that educators using this material will be prepared for possible glitches, and can change the content to suit their needs.

Body Systems Unit

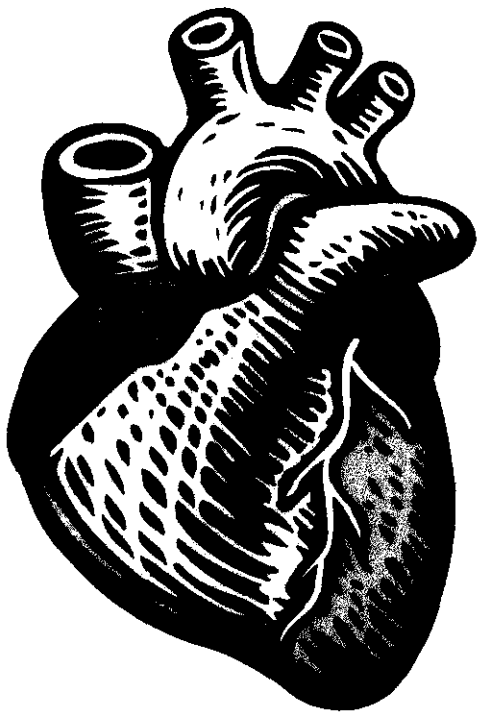
Purpose of Unit

This unit has been developed to follow the fifth grade Indiana Academic Standards. There are interesting, fun, and educational lessons that encourage student participation by including student-centered, hands-on activities.

Objective of Unit

Students will correctly state the major organs and functions of each of the major body systems.

Circulatory System



Abby Schortgen
April Kuehnert
Nikki Dammeier

Names: April, Nikki, Abby
Subject: Health
Lesson Topic: Circulatory System

Honors College: Thesis Project
Grade Level: Fifth

INTASC Principle #1: The professional educator understands content.

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.
Example: Describes how the circulatory system delivers oxygen and nutrients and carries away waste products from body tissues and organs.

Science 5.4.9
Explain that like other animals, human beings have body systems.

Annotated Bibliography
Instructional:
Fischer, Max W. Health and Safety Curriculum. New York: Instructional Fair: TS Denson, 1996.

In this book I found pages full of wonderful lesson plans and creative ideas on how to teach the body systems to a variety of grades. Many of the lessons could be adapted from one grade to another. The lessons were on everything from nutrition to the Circulatory System. There was also a list of literature that could be used along with many of the lessons that could be used to further engage students.

Glynn, Carol. Learning on their feet: A sourcebook for kinesthetic learning across the curriculum K-8.

This book provided me with numerous strategies, games, and tons of specific curriculum based kinesthetic lessons for all grades. These lessons could also be integrated with any other subject, math, language arts, reading, and even social studies. There were ideas on how to make the teaching of the circulatory system (and all other systems) captivating and fun.

Stark, Rebecca. The Human Body: Thinking About Science Series. Hawthorne, NJ: Educational Impressions, Inc., 2000.

This was a very informative and helpful book that contained a unit and lessons on how to teach the body systems. There were examples and activities that could be done to explain to teach students the different body systems and how they connect to each other.

Informational:

Brown, Paula S. The Incredible Body Machine. New York: Random House/ Children's Television Workshop, 1981.

This book was helpful in learning about the body systems. It reviews each system thoroughly in an easy to read manner. Punch outs of the body systems were also provided for detailed visualization, which was extremely helpful.

Williams, Frances Dr. Inside Guides: Human Body. New York: DK Publishing, Inc., 1997.

This book gave me a lot of really good information on the respiratory system. There are very colorful and detailed diagrams of the many parts of the system and a description of each and what it is responsible for within the system as a whole.

Name: April, Nikki, and Abby
Subject: Health
Lesson Topic: Circulatory System

Honors College: Thesis Project
Grade Level: Fifth

INTASC Principle #1: The professional educator understands content.

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

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Science 5.4.9
Explain that like other animals, human beings have body systems.

Lesson Objective(s): Students will be able to describe the cycle of the blood throughout the heart and body, and name the parts of the heart.

Materials/Media: model of heart, web link, computer with Internet access, worksheets, diagrams

New Information:

- Your heart is about the size of your clenched fist.
- The heart is divided into two pumps and each pump has two chambers (right and left atrium and ventricle).
- Blood low in oxygen is dark red (bluish).
- Blood high in oxygen is bright red.
- Arteries take blood away from the heart (the aorta is the biggest artery in the body).
- Veins take blood back to the heart.
- The pathway of blood:
    - Enters the *right atrium* through the superior and inferior vena cava,
    - Moves to the *right ventricle* through the *tricuspid valve*,
    - On to the lungs and the pulmonary arteries,

- Through the pulmonary veins back to the heart and into the *left atrium*,
- Through the *bicuspid valve* and into the *left ventricle*,
- Out to the rest of the body through the *aorta* (largest vein in the body)

Motivation:

- Instruct students to lay their hand (palm side up) on their desk and count how many times they can open and close their hand for one minute.
- Their hands should start getting tired after about 45 seconds.
- The students might start to wonder what they are doing... be sure they record how many times they opened and closed their hand. Don't stop! Let's see if we can keep going a little longer.
- Ask students what is their hand doing? (Opening and closing).
- What part of the body might your hand represent? (Heart)
- Which system of the body might use the heart? (Circulatory)
- Tell the students that today they will be learning about the circulatory system: **Goal for Learner**

Procedure:

1. Present **New Information:** Start out the lesson by using pre-made KWL chart. **(Questions, Cues, Advanced Organizers)** Have the students brainstorm ideas on what they know about the circulatory system and write those ideas in the first column.

- Then ask the students what things that might want to learn about the system as they go through the lesson. Write these ideas in the second column. Tell the students that they will be able to fill in the last column after the lesson.
- Tell the students that the circulatory system is the system that carries oxygen and nutrients to the cells; it also carries waste that needs to be gotten rid of (digestive and CO2), and it helps to fight diseases.
- Ask the students if they know what they main parts of the circulatory system are? (Heart, veins, arteries, and capillaries)
- Tell the students that the heart is the center of the circulatory system. It is a hollow muscle about the size of your fist. (Make your hand into a fist and ask the students to do the same, compare to neighbors)
- The heart is located a little bit left of the center of your chest.
- The hollow inside is divided into four sections. These sections are called chambers. Two chambers are on the left and right side. Each side has an upper and lower chamber, which are called the atrium and the ventricle respectively.
- Explain to the students that when they look at a picture of the heart it seems that the sides are mixed up. The right side is really the left and vice versa. This is because they are looking at a diagram. If the heart were inside of their body then it would be correct. But it is important to remember which side is which so they don't get confused. (Demonstrate on picture for greater understanding).
- Use the interactive website to show the students how the blood flows through the heart. http://www.medtropolis.com/VBody.asp **(Modeling)**

- Give students the *'YA GOTTA' HAVE HEART!* sheet. Have them use red and blue crayons/markers to draw the path of the blood as it is explained. (Red for oxygen rich blood and blue for blood with little oxygen.)
- Blood first enters the right atrium through two large veins called the superior vena cava and the inferior vena cava.
- The blood entering the right atrium is low in oxygen since it is returning to the heart after nourishing various parts of the body with oxygen. It is dark red or bluish in color.
- The blood then moves from the right atrium into the right ventricle through a valve called the tricuspid valve. It is called the tricuspid valve because it has three little flaps. These flaps prevent blood from moving backward into the right atrium, ensuring a one-way flow.
- When the blood is in the right ventricle the heart muscle pumps it the short distance to the lungs. Blood goes through the pulmonary arteries to the lung getting rid of its carbon dioxide and acquiring new oxygen, and then returns to the heart. This oxygen filled blood is bright red in color.
- The blood returns to the heart through the pulmonary veins leading to the left atrium.
- When the left atrial wall contracts, the blood is pushed through the bicuspid valve into the left ventricle. Ask students what they think the difference is between the tricuspid and bicuspid valve.
- The left ventricle contracts and forces the oxygen rich blood throughout the body. The blood goes through the aorta the largest artery in the body. The aorta has branches that distribute blood to all parts of the body.
- Hand out the *Diagram of the Heart* sheet. Have the students work in pairs to complete the sheet, writing the correct names of each part of the heart on the corresponding lines. **(Collaborative Learning) (Guided Practice)**

2. **Modeling:** (Located in Procedure): * Use the interactive website to show the students how the blood flows through the heart.
   http://www.medtropolis.com/VBody.asp

3. **Guided Practice:** (Located in Procedure): * Hand out the *Diagram of the Heart* sheet. Have the students work in pairs to complete the sheet, writing the correct names of each part of the heart on the corresponding lines.

4. **Check for Understanding:** The *Diagram of the Heart* sheet will be used to check for students' understandings of the subject matter being taught. If the students understand what they have learned through

5. **Practice/Application:** Hand out sheet with outline of body on it. There are many arrows going throughout the body. Have the students trace the flow of the blood with red marker for oxygen rich blood and blue marker for oxygen poor blood. Have the students map out the journey of the blood through the body. Start with the blood being pumped to the lungs by the right ventricle.

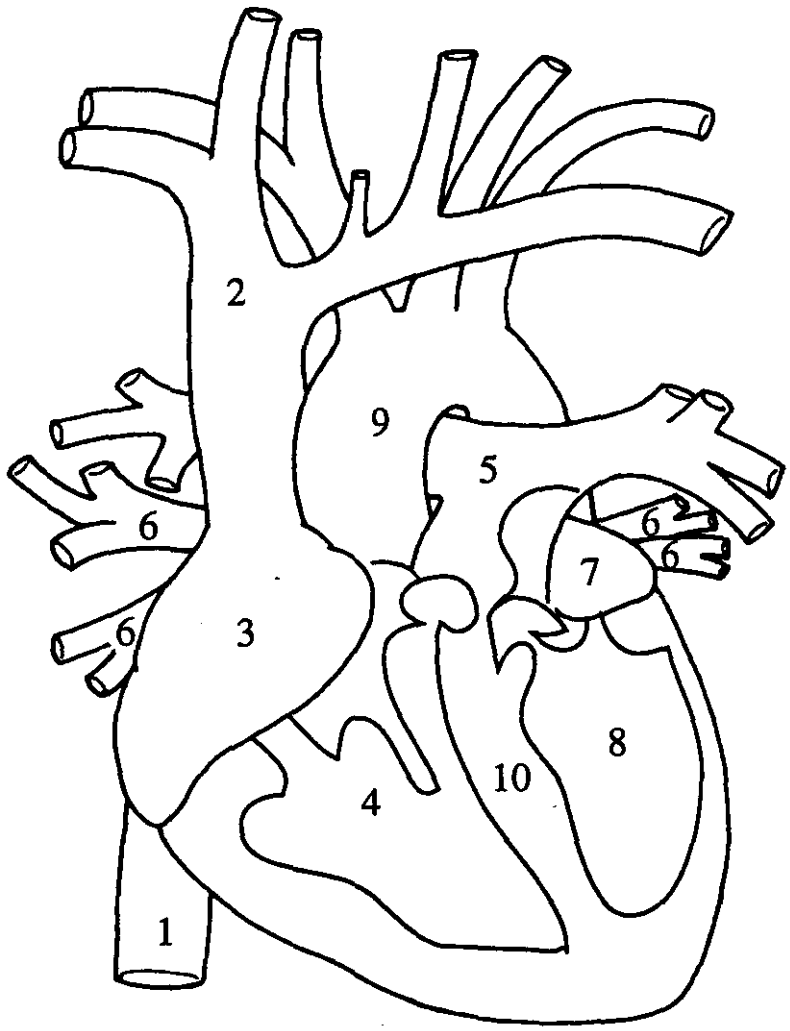
6. **Closure:** Use the *'Ya Gotta' Have Heart* sheet with the students and walk through the cycle of the blood and the names of the different parts of the heart and the circulatory system.

7. **Evaluation of Student Learning:**
   Hand out a blank copy of the heart diagram and have the students fill it in. Give the students a list of the different veins, arteries, and chambers, etc. for spelling purposes (these should be mixed up). Have the students color blue in the areas where oxygenated blood flows and red where the deoxygenated blood flows. Use a checklist to evaluate their diagrams.

8. **Lesson Extension:**
   Have students pair up for the *How Does your Heart Rate?* activities. Students will discover if they have healthy hearts.

Diagram of the Heart

Directions: Write the correct name for each numbered part of the heart.



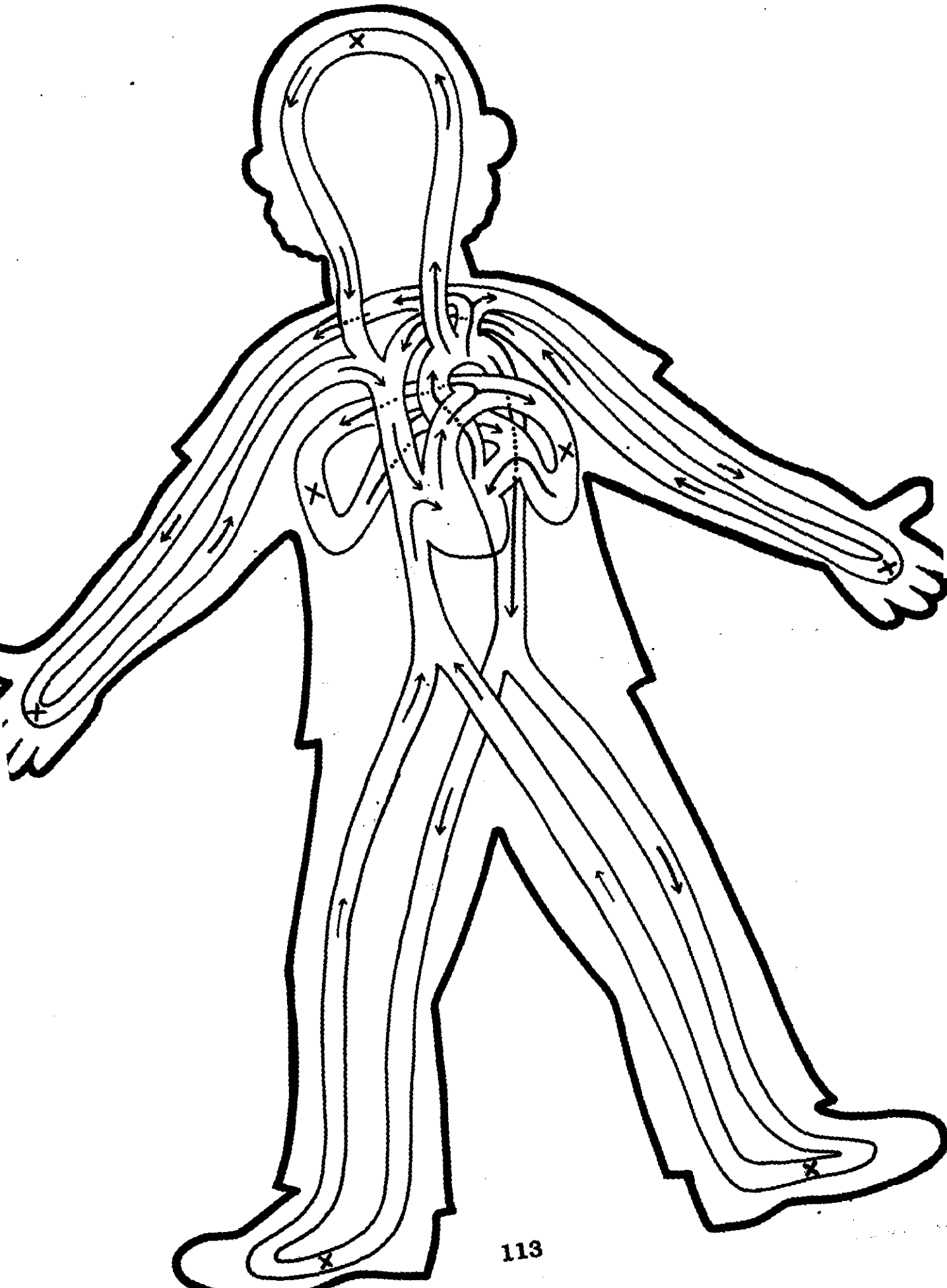
1. _____ 6. _____

2. _____ 7. _____

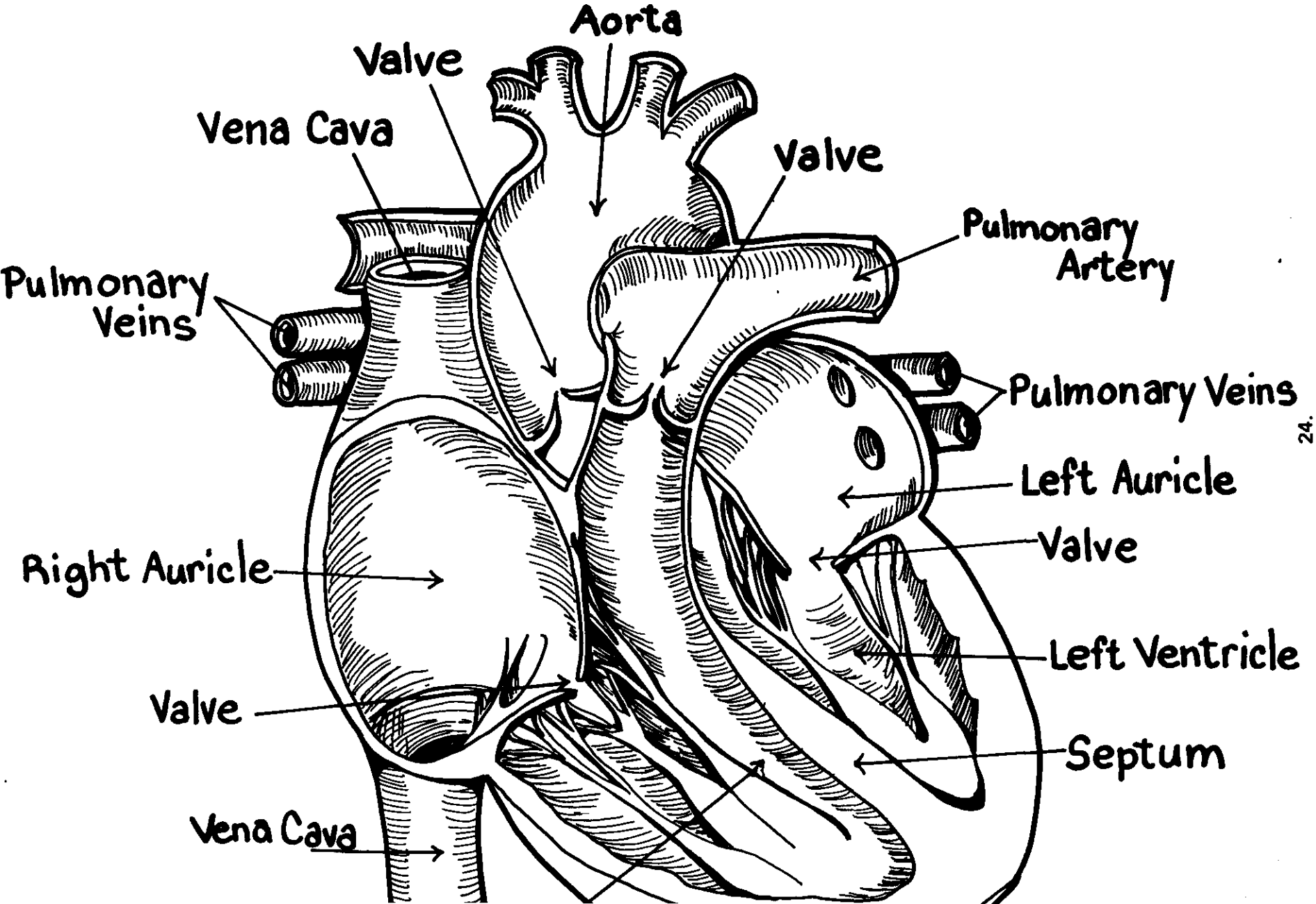
3. _____ 8. _____

4. _____ 9. _____

5. _____ 10. _____



'YA GOTTA' HAVE HEART!



Digestive System

Abby Schortgen
April Kuehnert
Nikki Dammeier

Names: Abby, April, Nikki
Subject: Health
Lesson Topic: Digestive System

Honors College: Thesis Project
Grade Level: Fifth Grade

INTASC Principle: The professional educator understands content.

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and use basic heath terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.
Science 5.4.9
Explain that like other animals, human beings have body systems.

Annotated Bibliography:
Informational Sources
American Medical Association Website. Digestive System.
http://www.ama-assn.org/ama/pub/category/7155.html
This website was helpful in providing basic information concerning the digestive system.

Toriello, James. The Stomach: Learning How We Digest. Rosen Publishing Group, 2002.
This book was helpful in stating facts about the digestive system. The book is available at Bracken Library in Educational Resources (Ball State University).

Instructional Sources
Stille, Darlene R. The Digestive System: A True Book. Children's Press. March, 1998.
This book provided activities to teach the digestive system. This book is available at Bracken Library in Educational Resources (Ball State University).

A Look Inside the Human Body-Digestive Tract.
http://www4.tpgi.com.au/users/amcgann/body/digestive.html
This website provided information and activities to help teach about the digestive system.

Name: Abby, April, Nikki
Subject: Health
Lesson Topic: Digestive System

Honors College: Thesis Project
Grade Level: Fifth Grade

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and use basic heath terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.

Science 5.4.9
Explain that like other animals, human beings have body systems.

Lesson Objective: Students will describe the digestive process by drawing, labeling, and defining the organs involved in the digestive system and state their functions.
Students will apply what they have learned about other body systems by drawing conclusions about how and why the systems working together.

Materials/Media: KWL chart, notecards with the function of the organs, larger notecards with the name of the organs, masking tape, M&M's, zip-loc baggies, paper bags, plastic bags, newspaper, labels of the organs, outline of the body for each student

New Information:

- Purpose of the digestive system is to break down what we eat
- Adult's digestive tract is 20-30 feet long.
- Digestion:
    - Begins in the mouth where food is softened
    - Tongue pushes food against teeth
    - Teeth cut, chop and grind food
    - Saliva moistens food and contains enzymes which begin the break down
    - Food is pushed by the tongue through the pharynx and into the esophagus

- Food is pushed down the esophagus to the stomach by muscle contractions called peristalsis
- The stomach contracts about 3 times per minute mixing food with gastric juices
- In about 4 hours, the gastric juices break the food down into a substance called chyme
- Little by little, the chyme is released into the small intestine
- Most digestion occurs in the small intestine
- Small intestine is about 20 feet in length
- More juices are mixed with the chyme to break it down even further
- Nutrients are absorbed into the capillaries of the small intestine and carried through the bloodstream
- The chyme is in the small intestine for 3-6 hours
- The indigestible food is carried to the large intestine
- The large intestine is 5-6 feet long
- Indigestible food is stored here for 12-24 hours
- Water and dissolved salts are absorbed by the large intestine
- The waste is excreted from the body

Motivation: Show the students a diagram of the digestive system. Ask them to make some guesses about how long the digestive tract would be if it were stretched out, and how long food is in the body (from mouth to excretion of waste). Tell the actual length (20-30 feet), and the actual time (20-34 hours).

Goal for Learner: Today we are going to discuss the digestive system and how it works. We will learn about the path that food takes from going into the mouth to exiting the large intestine. We will also learn about the function of the tongue, saliva, esophagus, stomach, small intestine and large intestine.

Procedure:

1. **New Information** – To determine what the students already know, have them fill out a KWL chart as a class. Ask students what they already know about the digestive system, and write it in the first column. Then ask them what they would like to learn about the digestive system, and write it in the middle column. After the lesson, make sure to ask them what they learned so that they can fill out the last column. **Instructional Strategies: Question, Cues, and Advanced Organizers** Ask some students to volunteer to read the descriptions of the organs involved in the digestive system. (Have this prepared on notecards so that each student can just read the function). Begin with the mouth, and have a large notecard with the word "mouth" written on it. As students read the function of each organ, place the name of the organ on the chalkboard in the correct order. This will allow for visual learners to see the progression through the system.

2. **Modeling** – The students will participate in an activity where they each become a part in the digestive system. In order to avoid chaos, it is important to demonstrate exactly

what the students will do. Show them how the food particle is "broken down," and make sure that they understand the path and the different organs.

3. **Guided Practice** – Assign each student a role in the digestive system (it may be necessary to assign 2 students to a role). Place to long strips of masking tape on the floor about 3 feet apart. Have labels of the different parts of the digestive system ready so that you can place them on the floor and the students will know where to stand. Have half of the students stand on each piece of tape facing each other. The food particle will be M&M's placed in a zip-loc baggie, wrapped in newspaper, placed in small paper bags, placed in a large plastic bag with newspaper stuffed around it (the large bag should be taped closed). The students representing the mouth will lightly spray the food particles with a spray bottle. Each organ following will remove a piece of the particle until there is nothing but M&M's. The M&M's will be taken away by the blood, and the rest will exit the system.

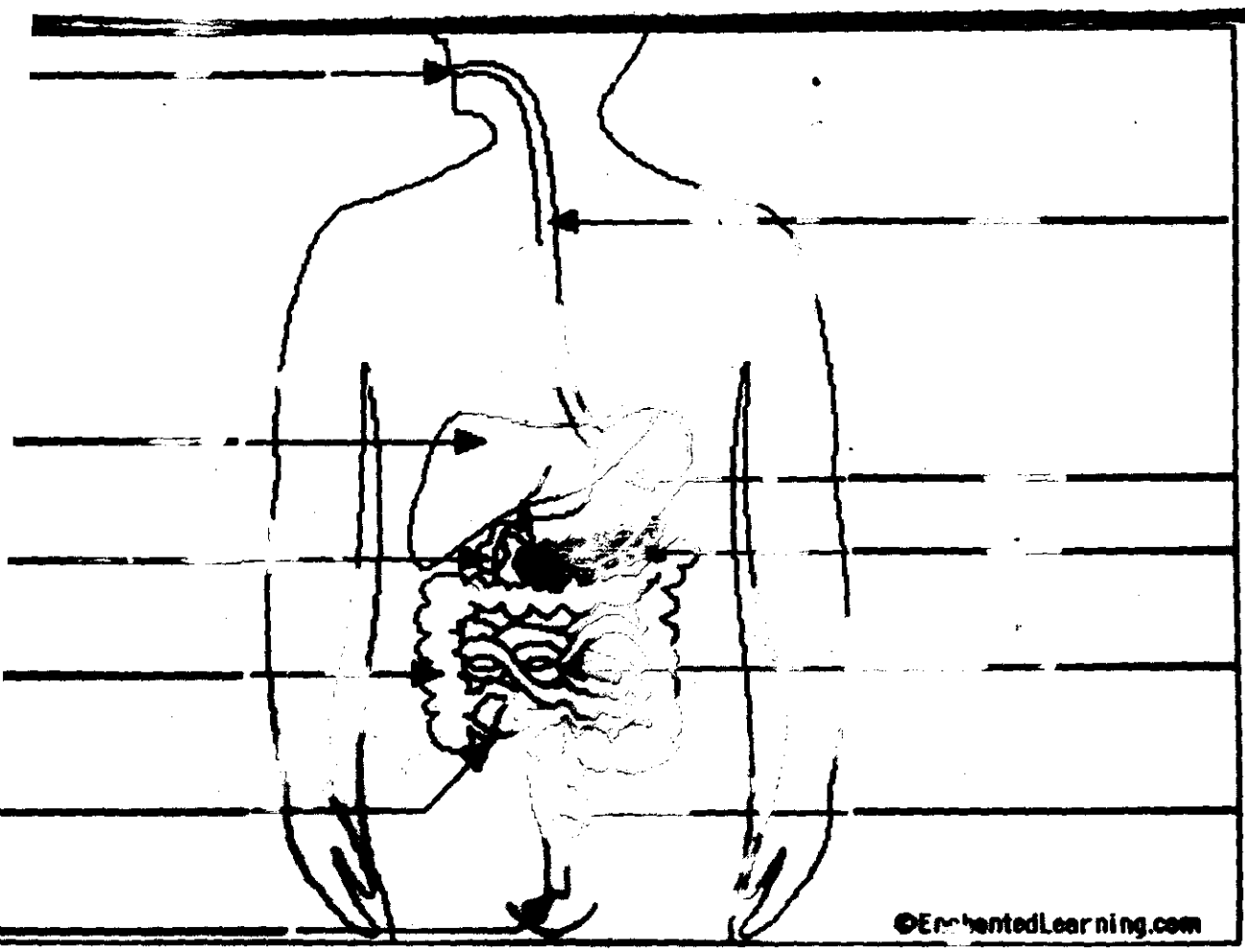
4. **Check for Understanding** – After the guided practice activity, ask students some questions. Why is it important for all of the organs to work together? What happens if one of the organs isn't functioning correctly? What other body systems does the digestive system work with? **Instructional Strategies: Questions, Cues, and Advanced Organizers**

5. **Practice/Application** – Give students an outline of a body, and have them draw the digestive system. Have them label each part, and then on the side give a brief description of the function of each part.

6. **Closure** – Briefly discuss the drawings, and tie in the digestive system to the other body systems. Make sure that students can list the different parts, and that they know the basic function of the system. Emphasize the fact that all of the systems are related, and that it is essential that they all work together for our bodies to function correctly.

7. **Evaluation of Student Learning** – Based on the drawings that students do, evaluate them using a checklist. Make sure that the organs are in the correct order, all organs are present, and that the functions listed are correct.

8. **Lesson Extension** – If there is time after the lesson, have students use computers to look up interactive sites. They can click on the parts of the digestive system, and see how food actually passes through.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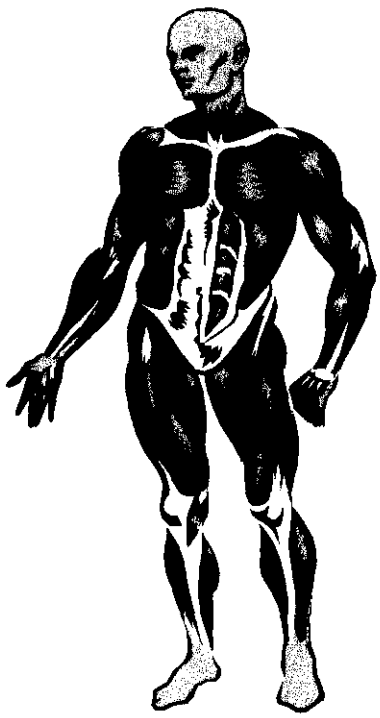
Muscular System



Abby Schortgen
April Kuehnert
Nikki Dammeier

Names: Abby, April, Nikki
Subject: Health
Lesson Topic: Muscles

INTASC Principal: The professional educator understands content.

IN State Standards:
Health Standard 1
Student will comprehend concepts related to health promotion and disease prevention.
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
The Living Environment
Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environment.

IN State Sub-standards:
5.1.5 Describe the basic structure and functions of the human body systems.
5.4.10 Explain that like other animals, human beings have body systems.

Annotated Bibliography:

Informational Sources

Silver, Donald M. and Wynne, Patricia J. The Body Book. Scholastic Professional Books (p 124-126) 1993.
This book has information about how the muscular system works and how one keeps muscles healthy and strong. It can be found at Shared Information Services in Burris Laboratory School.

http://www.kidshealth.org/kid/body/muscles_noSW.html
This website was helpful while gathering basic information about muscles. It has interactive links for extensions as well.

Instructional Sources

Biel, Andrew R. Dorn, Robin. *Trail Guide to the Body: How to Locate Muscles, Bones & More!* Books of Discovery; (September 1997)
This is a hands on guide book to the body and a way for children to locate muscles and bones. This book is available on Amazon.com.

Jeffreys, Celestine. MuscleMania. Beethoven Academic Center. 1998.
This is an activity to help students experience the function and actions of muscles. It is available on ERIC

Lesson Plan
Muscles in Motion

IN State Standards: Students will comprehend concepts related to health promotion and disease prevention. Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
The Living Environment
Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Sub-standards:
5.1.4 Describe the basic structure and functions of the human body systems.

5.4.9 Explain that like other animals, human beings have body systems.

OBJECTIVES:
Students will demonstrate the flexion and extension of muscles.
Students will locate muscle groups on the body.
Students will make a model of the bicep and triceps muscles.

Materials/Media:
Five- or six-pound dumbbell, wood pieces, balloons, tape, pictures of each type of muscle, poster of a muscular man to be labeled.

Motivation: I will have the students stand up and together we will stretch our muscles. While we stretch our arms, and legs I will ask the students if they know why it is important to stretch. I will also be asking the students which muscle we are stretching to get an idea of what information they have already been given. When we have finished stretching I will tell the students: "Today we are going to talk about the different types of muscles and how they work together to give us strength." **(Goal for Learner)**

New Information:
- Muscles make up the body system that allows us to be active and move around.
- While one muscle flexes, its opposite muscle extends.
- There are different muscles that move the different parts of the body.

- Muscle groups work together, so that we can perform simple and complex tasks with our body parts.
- Some muscle names are: bicep, triceps, gluteus maximus, latissimus dorsi, pectoralis major, gastrocnemius, hamstring, quadriceps, etc.
- These are all skeletal muscles.
- The heart is also a muscle, it is made of cardiac muscle, this muscle pumps automatically, we do not have to consciously tell our heart to beat.
- Smooth muscles are another type, this type of muscle is found in the digestive system.

Procedure:

1. I will ask the students to flex their arms by bending their lower arms up from the elbow. I will then have them extend their arms by raising their arms straight above their heads. Make sure students understand the terms *flex* and *extend*.
2. I will ask the students if they know which muscles they used to perform each action. If they are unfamiliar with the terms *biceps*(flex) and *triceps* (extend), I will introduce the terms now.
3. I will ask the students to vote on whether the following statement is true: Most people's biceps are stronger than their triceps.
4. I will ask the students where the muscles are that they think are the strongest in their bodies. We will discus the bicep, triceps, gluteus maximus, latissimus dorsi, pectoralis major, gastrocnemius, hamstring, quadriceps, etc.
5. As the students name or point to different muscles I will give them the name of the muscle and they will attach it to the poster. **(Nonlinguistic Representation/Instructional Strategy)**
6. I will tell students they are going to perform an experiment that will test the statement.
7. Divide the class into groups, giving each a dumbbell to work with.
8. **Modeling:** I will show and instruct group members to take turns doing the following exercise: Stand with your back against a wall, hold the dumbbell in your dominant hand, letting the dumbbell hang at your side with your arm fully extended downward. Raise the dumbbell by bending your arm from the elbow toward your face as far as you can. Lower the dumbbell by fully extending the arm downward. **(Cooperative Learning/Instructional Strategy)**
9. The students will repeat the exercise until she or he feels tired. Group members should record the number of repetitions for each student.
10. **Modeling:** Next, I will have students take turns doing the following: Stand with your back against a wall, hold the dumbbell in your dominant hand, letting the dumbbell hang at your side with your arm fully extended downward. Bend your arm at the elbow, bringing the dumbbell up toward your face and holding the dumbbell next to your ear on the same side of the body. Rotate your wrist so your palm is facing away from you. Now push the dumbbell straight up into the air until the arm is fully extended; then return the dumbbell so that it is next to your ear again.

11. Have each student repeat the exercise until she or he feels tired. Group members should record the number of repetitions for each student.
12. **Guided Practice:** Compute class averages for the "flex" and "extend" exercises. This is the same as saying how many times could they lift the dumb bell with their bicep and triceps.
13. We will discuss whether the results of the test agreed with the class vote prior to the experiment.
14. Continue the discussion by asking students what makes one muscle stronger than another.
15. **Check for understanding:** Next, we will talk about the muscles that we have that are very strong. For example, our quadriceps and hamstrings help to hold us up all day long. Our heart is also very strong muscle because it is constantly exercising as it pumps.
16. **Practice/Application:** To demonstrate the idea of a muscle flexing and extending we will make a muscle model. (see attached activity)
17. The college students will be helping the groups to make sure the models are put together correctly. Hopefully each group will have a model of the bicep and triceps that shows how they work together. **(Nonlinguistic Representation/Instructional Strategy)**
18. **Closure:** Once the models are made we will talk about what might happen if our muscles did not work together, if they did not flex and extend like they are supposed to. We will also talk about what we can do to keep our muscles healthy, for example: exercise, eat healthy foods, wear warm clothes when it is cold outside, etc.

Lesson Evaluation:

To evaluate the students' performances we will observe their participation during discussions, and ability to identify and label the muscles that we have discussed.

Lesson Extension:

The students will play "Simon Says" using the muscle groups. I will begin by being "Simon", and then the student that wins will take turns being Simon.

Muscle Models

Have your students make models of their arm muscles. Give each group or pair of students two cardboard strips, 2 inches by 6 inches; two paper fasteners; tape; a hole puncher; a red balloon; and a blue balloon. Then have them follow these instructions:

- Punch a hole in each cardboard strip, about 1.5 inches from the end, and in both ends of each balloon.

- Tape the two strips together end to end so that the holes are about 3 inches apart. The strips will bend like a joint on the taped side. (One strip represents the upper arm; the other represents the lower arm; the joint represents the elbow.)

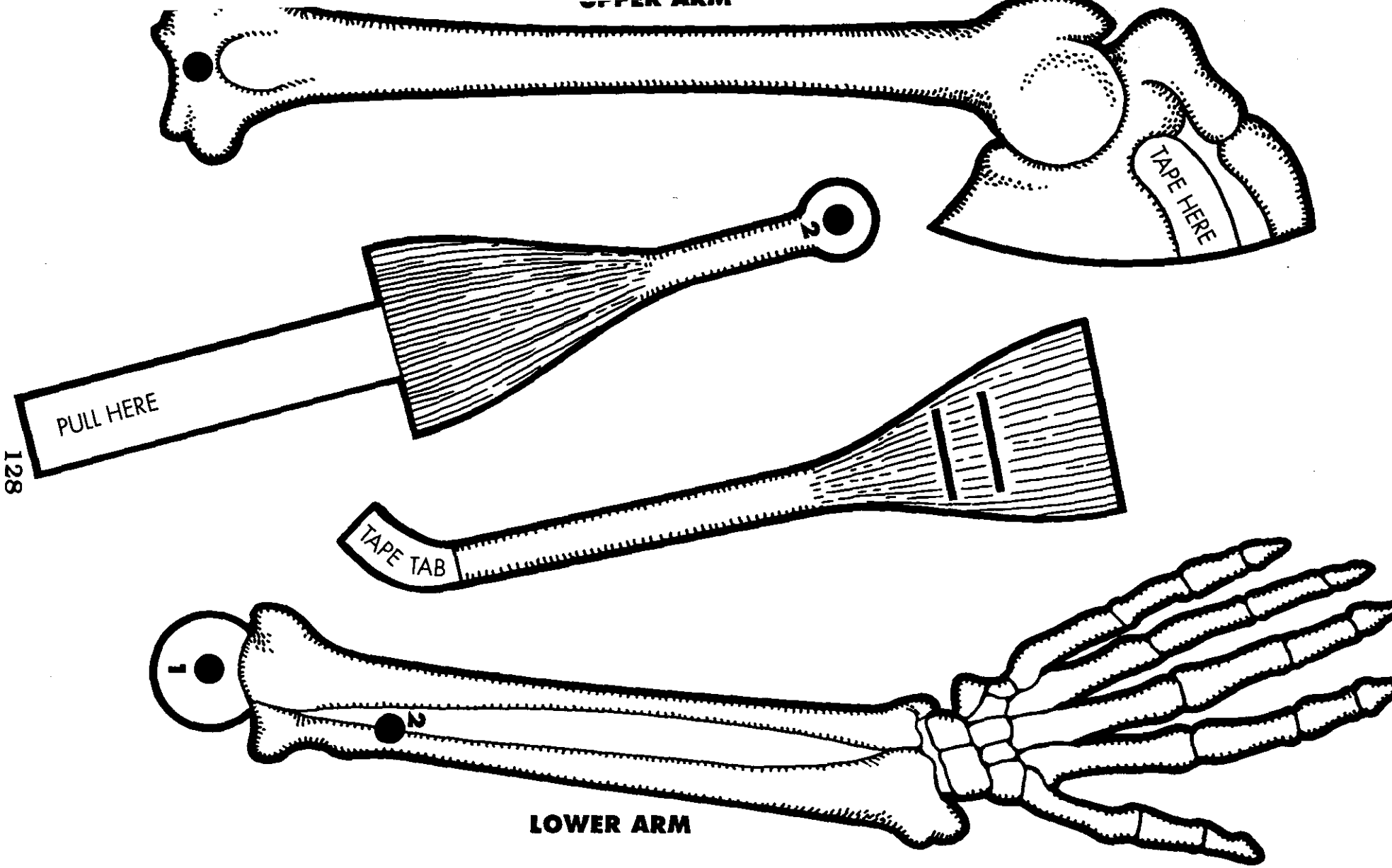
- With a paper fastener, attach the two balloons to opposite sides of the "upper arm," with the red balloon on the taped side. Attach the other end of each balloon to the "lower arm" in the same way.

- Bend the "arm" at the "elbow," noticing what happens to the balloons. The red balloon will become shorter, or "contract," while the blue one will stretch out, or "relax."

Explain that the red balloon is like the biceps muscle and the blue balloon is like the triceps. One relaxes as the other contracts.

http://www.discoveryschool.com

PULL
PULL
TAB



LOWER ARM

Nervous System

Abby Schortgen
April Kuehnert
Nikki Dammeier

Names: Abby, April, Nikki
Subject: Health
Lesson Topic: Nervous System

Honors College: Thesis Project
Grade Level: Fifth Grade

INTASC Principle: The professional educator understands content.

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and use basic heath terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.
Science 5.4.9
Explain that like other animals, human beings have body systems.

Annotated Bibliography:
Informational Sources
American Medical Association Website. Digestive System.
http://www.ama-assn.org/ama/pub/category/7172.html
This website was helpful in providing basic information concerning the nervous system.

Stille, Darlene R. The Nervous System: A True Book. Children's Press. March, 1998.
This book provided information about the nervous system. This book is available at Bracken Library in Educational Resources (Ball State University).

Instructional Sources
Neuroscience for Kids-Reflexes
http://faculty.washington.edu/chudler/chreflex.html
This website provided activities to teach the nervous system.

A Look Inside the Human Body-Nervous System.
http://www4.tpgi.com.au/users/amcgann/body/nervous.html
This website provided information and activities to help teach about the digestive system.

Name: Abby, April, Nikki
Subject: Health
Lesson Topic: Nervous System

Honors College: Thesis Project
Grade Level: Fifth Grade

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and use basic heath terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.

Science 5.4.9
Explain that like other animals, human beings have body systems.

Lesson Objective: Students will predict and observe the various processes of the nervous system.

Materials/Media: computer, boxes with various items to feel, diagram of the brain, facts for the brain, diagram of the nervous system.

New Information:

- Nervous system is composed of the brain, spinal cord, and nerves
- The brain sends and receives messages through the nerves
- Nerves transmit information as electrical impulses
- Some nerves carry messages to the brain
    - These nerves allow us to see, hear, smell, taste and touch
- Some nerves carry messages from the brain to muscles to control body movement

Motivation: Show the students a diagram of the nervous system. Ask them if they know what parts of the body make up the nervous system. Ask them why they think the system is called the "nervous system." Encourage them to discuss what are bodies would be like without the nervous system.

Goal for Learner: Today we are going to discuss the nervous system and how it works. We will learn about the different parts of the nervous system and how it helps our bodies to function.

Procedure:

1. **New Information** – Use the chart to explain to students that electrical impulses are sent from the brain, down the spinal cord and through each of the nerves to the muscles. These impulses cause the muscles to contract, and we are able to move. Ask students to predict what they think the nervous system has to do with the senses. Have them briefly write out their prediction. Briefly discuss that nerves carry the senses to the brain. The brain then decodes these senses.

2. **Modeling** – The students will participate in a variety of activity centers. Briefly go to each center, and show students what to do at each one. At the computer, use the website listed below to allow students to explore the nervous system. At one center, students will be able to learn about reflexes (what they are), and test their reflexes. At the rest of the centers, students will test their senses of "touch," "smell," and "sight."

Center #1

Computer – **Guided Practice**- Have the students explore this website and write down at least 10 facts about the nervous system.

Center #2

Reflexes – Have the group of students come up with a definition of what they think "reflexes" are. Then have them do the following activities:

-Have each group separate into pairs. Have one student sit in a tall chair, and the other student gently hit the knee right on the knee cap. They should see the knee jerk reflex. Repeat a couple of times, and describe the feeling.

-Have one of the students dangle a ruler between the other students index finger and thumb. At any time that they wish, have the student drop the ruler, and measure where the ruler was caught. Do this 8-10 times to see if the reflexes improve.

-Have one student open their eyes very widely, and then squint them together. Have the other student observe and record his/her observations of the pupil.

Finally, have the group come up with a second definition for reflexes.

Center #3

Senses (Feeling) - Have one box for each student on a table. Make sure that the students cannot see into the box, but they can reach into the box. Have a variety of items in the box for students to figure out. (Rabbits foot, computer disk, money, candy, eraser, etc).

have 15-20 different items in the box. Make sure size and texture are varied. Have student first describe the item, then guess the name.

Center #4

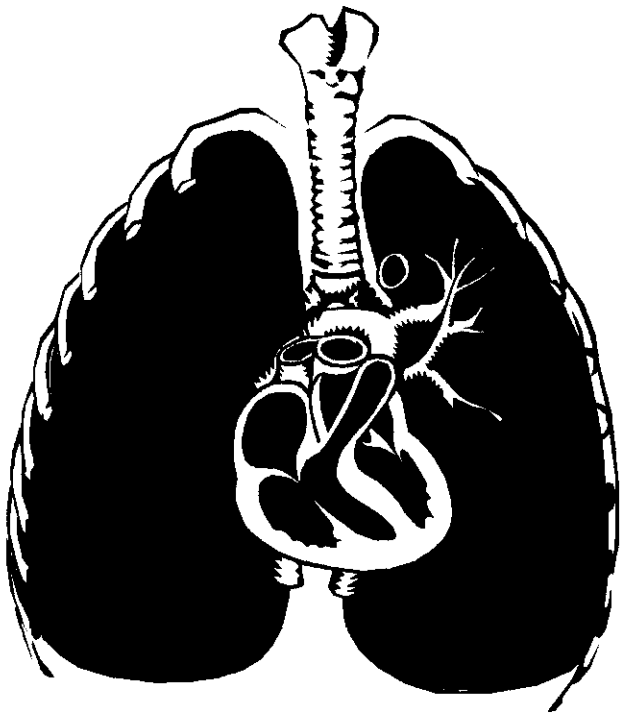
Brain – Have a diagram of the brain available to the students (just for reference). The students will learn many interesting and unusual facts about the brain. Tell the students that they will be predicting the answers by filling in the blank.
Example: The adult brain weighs_____ pounds.
After the students have made their predictions, they will receive the actual answers, and discuss if there is time.

6. **Closure** – Pull the students back together as a group. Take one center at a time, and have an in depth discussion with the students. Find out what they learned, and what they already knew. Find out what surprised them, and things that they found interesting.

7. **Evaluation of Student Learning** – Evaluations will be based on teacher observations. Student participation is necessary in order for learning to occur. Evaluation will also be based on the discussion after the centers are completed.

8. **Lesson Extension** – If there is time after the lesson, have students write in journals about what they learned. Have them write about what we would be like without the nervous system.

Respiratory System



Abby Schortgen
April Kuehnert
Nikki Dammeier

Names: April, Nikki, Abby
Subject: Health
Lesson Topic: Respiratory System

Honors College: Thesis Project
Grade Level: Fifth

INTASC Principle #1: The professional educator understands content.

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.

Science 5.4.9
Explain that like other animals, human beings have body systems.

Annotated Bibliography
Instructional:

Fischer, Max W. Health and Safety Curriculum. New York: Instructional Fair: TS Denson, 1996.

In this book I found pages full of wonderful lesson plans and creative ideas on how to teach the body systems to a variety of grades. Many of the lessons could be adapted from one grade to another. The lessons were on everything from nutrition to the Circulatory System. There was also a list of literature that could be used along with many of the lessons that could be used to further engage students.

Siepak, Karen Lee. Body Systems and Organs Step-by-Step Series. Philadelphia, PA: Carson-Delosa Publishing Company, Inc., 1995.

This was a very helpful book on various ways to teach the body systems through hands-on experiments. There were a variety of lessons and activities to use and get numerous ideas from. The activities in the lessons follow the scientific method, each have a specific written purpose, and step-by-step directions.

Wiebe, Arthur; Eckland, Larry & Merciew, Sheryl. From Head to Toe. Boston, MA: AIMS Ed. Foundation, 1986.

This book is a collection of activities and studies done of the human body. These studies can be used with the activities to instruct students as to how the various body systems work. These lessons are also meant to help build self-awareness and inform students of ways to keep their systems functioning and healthy.

Informational:

Brown, Paula S. The Incredible Body Machine. New York: Random House, Inc., 1981.

In this book I found information on how the respiratory system works. There was a detailed, step-by-step, description of how oxygen and carbon dioxide go through the respiratory system. A diagram was also provided to make visualization and understanding much easier.

Williams, Frances Dr. Inside Guides: Human Body. New York: DK Publishing, Inc., 1997.

This book gave me a lot of really good information on the respiratory system. There are very colorful and detailed diagrams of the many parts of the system and a description of each and what it is responsible for within the system as a whole. This book can be found in Shared Information Services, in Burris Laboratory School.

Names: April, Nikki, Abby
Subject: Health
Lesson Topic: Respiratory System

Honors College: Thesis Project
Grade Level: Fifth

IN State Standard:
Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
Students learn about an increasing variety of organisms- familiar and exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Substandard:
Health 5.1.4
Describe the basic structure and functions of the human body systems.

Science 5.4.9
Explain that like other animals, human beings have body systems.

Lesson Objective(s): Students will describe the cycle of taking in oxygen and releasing carbon dioxide. Students will determine what parts of the body are involved in the respiratory system.

Materials/Media: poster or picture of the respiratory system, web link, computer, cutouts to make respiratory model, directions and materials for *How Air Moves In and Out of the Lung* activity

New Information:
- This system deals with breathing.
- Breathing is called respiration.
- Breathing is an involuntary process.
- We breathe in and out of our nose and mouth.
- Inhale and exhale.
- In the alveoli within the lungs is where the exchange of oxygen and carbon dioxide take place.
- The diaphragm is the muscle that controls the breathing process.
- The diaphragm is an involuntary muscle.
- The trachea (windpipe), bronchi, bronchioles, and alveoli are also part of the respiratory system.

Motivation:

- While students are just sitting ask them to count how many time they breathe in and out in thirty seconds. Have them write the number down.
- Next ask students to stand up and do 30-40 jumping jacks, then count how many times they breathe in and out in thirty seconds.
- Ask the students if they think they know what they are going to be learning about today.
- Tell the students that they will be studying and learning about the respiratory system: **Goal for Learner**

Procedure:

1. Present **New Information:** Start out the lesson by using a pre-made KWL chart. **(Questions, Cues, Advanced Organizers)** Have the students brainstorm ideas on what they know about the respiratory system (parts of body, what it does, etc.) and write that in the first column.

- Then ask the students what things they might want to learn about the system as they go through the lesson. Write these ideas in the second column. Tell the students that they will be able to fill in the last column after the lesson.
- Use poster of respiratory system to explain to students. **(Modeling)**
- Tell the students that the respiratory system is the system of the body that deals with breathing. The breathing process is called respiration. This is an involuntary process, which means that we don't have to think about it. You can control your breathing process for a short while if needed (while swimming, panting, or holding breathe). For the most part, though, our breathing muscles perform by themselves.
- When we breathe, the body takes in oxygen that it needs, and removes the carbon dioxide that it doesn't need.
- All the cells in your body require oxygen. Without it, they couldn't move, build, reproduce, and turn food into energy. In fact, without oxygen, they and you would not be able to survive.
- Ask the students to recall the beginning task where they counted the number of breaths they took while resting and then after exercising. Ask the students "Why do you think you have to breathe faster when you exercise?" (To supply their muscles with enough oxygen and to get rid of waste carbon dioxide.
- Hand out the materials to make a model of the respiratory system. Have the students, together, and with the teacher, construct the model as they learn about the different organs in the system. **(Guided Practice)**
- You breathe with the help of your diaphragm and other muscles in your chest and abdomen. When your diaphragm pulls down, it leaves more space for the lungs to expand. (Have students place their hands on their ribs just where they curve away from each other, a little way below the breastbone. Tell the students to breathe in deeply and to feel what happens under their hands. What do you feel? (They are feeling the diaphragm pull down toward the abdomen as they inhale). Instruct the students to exhale sharply and feel the diaphragm squeeze upward.)
- You suck in air in an inhale through your nose or mouth.

- The air passes through your nasal passages: Does anyone know what happens to the air in your mouth and nasal passages? (The air is filtered, heated, moistened) and enters the back of the throat. It flows down through the trachea (windpipe), past the larynx or vocal cords, to where the lowermost ribs meet the center of your chest.
- There, your trachea divides into two tubes called the bronchial tubes. Each bronchial tube divides into smaller and even smaller tubes as it enter the lung. They branch out like limbs on a tress, becoming like small twigs at the end of each tube. These smaller branches are called bronchioles and there are more than 250,000 of them.
- At the end of each tiny tube are microscopic air sacs called alveoli. Each sac has an extremely thin wall around it. Capillaries, which are small blood vessels with thin walls, are wrapped around these alveoli. The walls are so thin and close to each other that the air easily seeps through. In this way, oxygen seeps through into the bloodstream and carbon dioxide, in the bloodstream, seeps through into the alveoli. This is the exchange of gases.
- The air inhaled expands your lungs like a pair of balloons. When your diaphragm relaxes, the empty hollow space inside your body gets smaller again. Your muscles squeeze your rib cage and your lungs begin to collapse as the waste, carbon dioxide, is pushed up and out of your body in an exhale.

2. **Modeling:** (Located in Procedure): * Use poster of respiratory system to explain to students.

3. **Guided Practice:** (Located in Procedure): * Hand out the materials to make a model of the respiratory system. Have the students, together, and with the teacher, construct the model as they learn about the different organs in the system.

4. **Check for Understanding:** (Located in Procedure): *The students are asked questions periodically throughout the lesson to make sure that they are understanding and obtaining the subject matter being taught.

5. **Practice/Application:** Pair up the students. Have one student trace around the top part of the other and vice versa. Then on their own, have the students draw in and label the main parts of the respiratory system and trace the path that oxygen takes going in and carbon dioxide takes going out. Use different colors for oxygen and carbon dioxide.

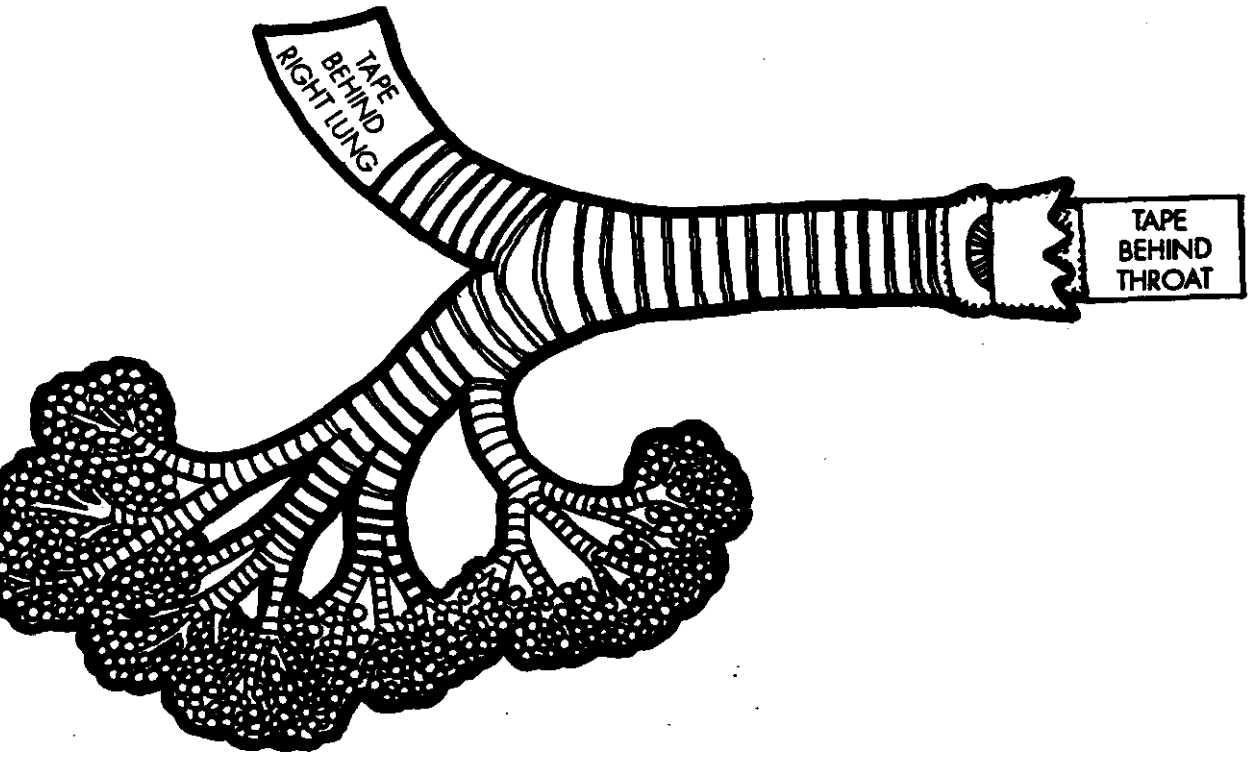
6. **Closure:** Using the model that the students made, start at the very top and have the students: 1) tell what part of the system is being pointed to and 2) what that part of the system does.

7. **Evaluation of Student Learning:**
   Use the students' drawings of the Respiratory system as an evaluation tool. Create a checklist of items that the students must have on their drawings. Make sure that the

drawn pathways are correct and that the students used the correct color (red or blue) to show whether it was oxygen or carbon dioxide.

8. Lesson Extension:

Divide the students into groups and ask them to prepare a short skit in which one member is air and the others are the parts of the respiratory system doing their job. Students will present their skit to the class if time is permitted.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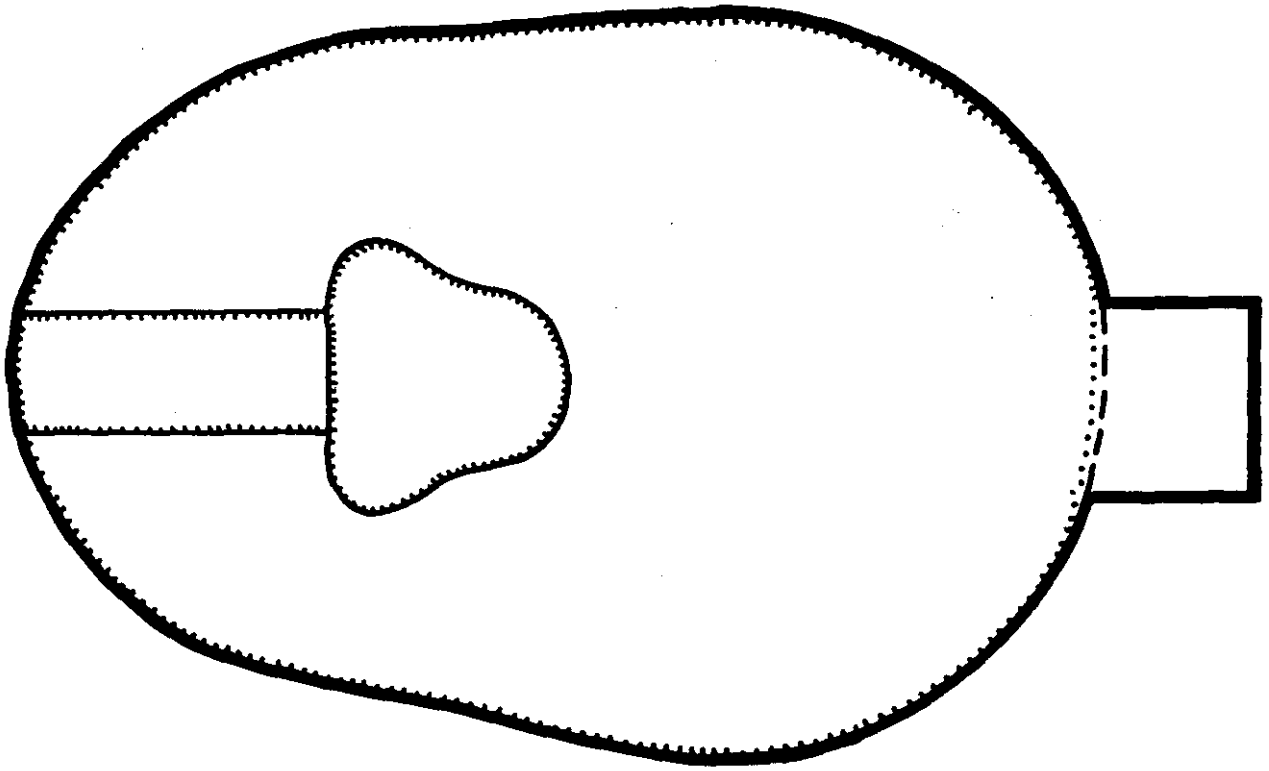

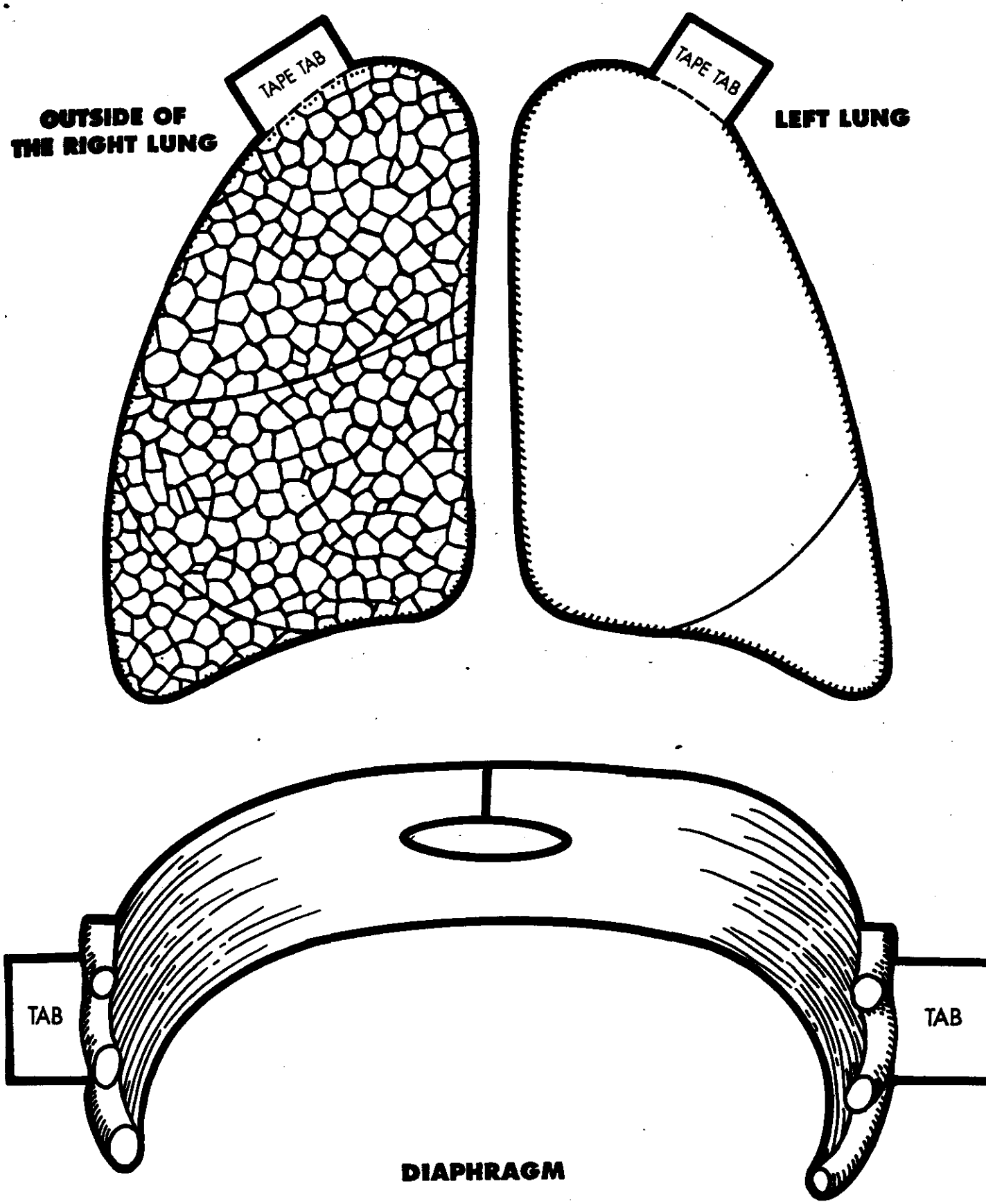
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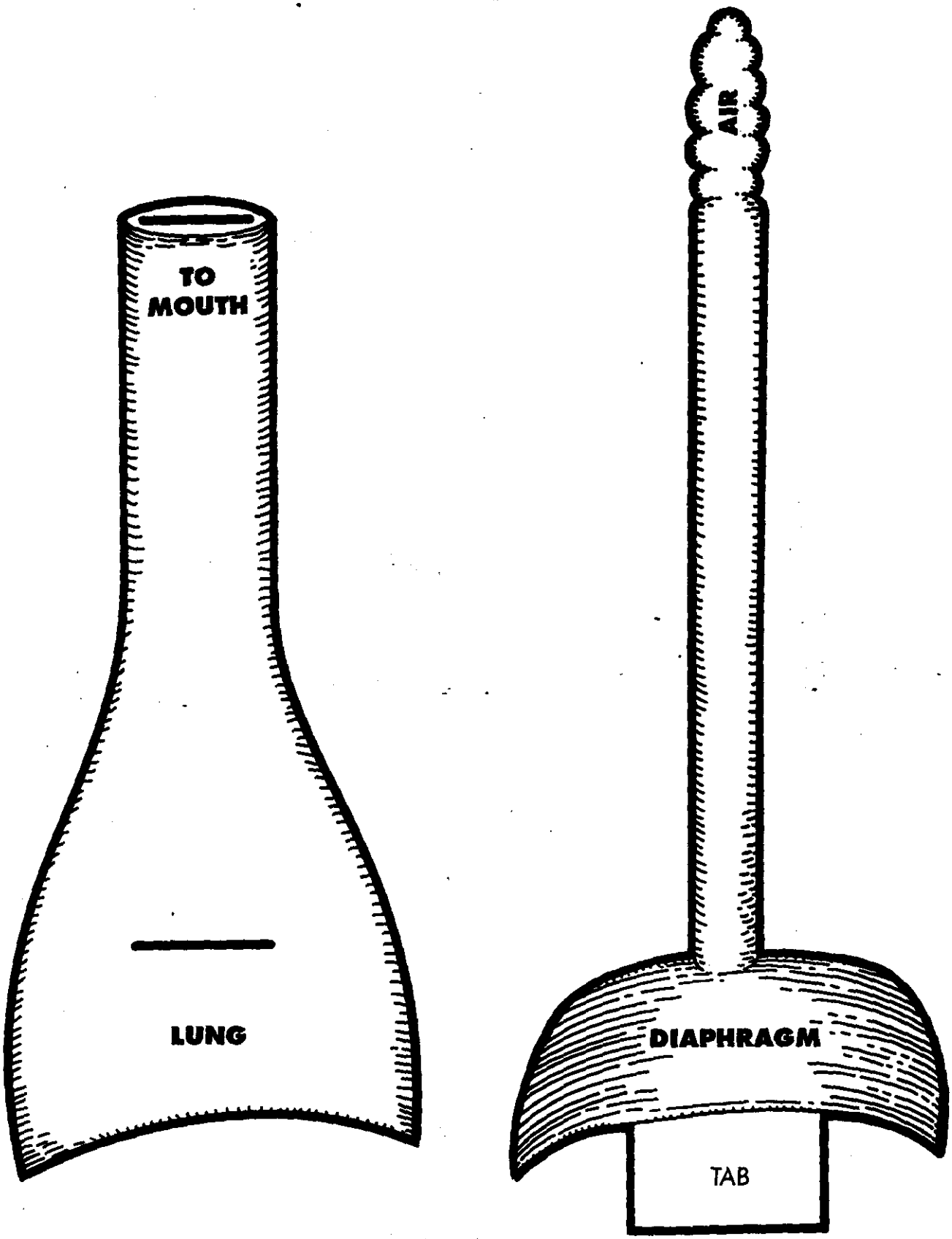
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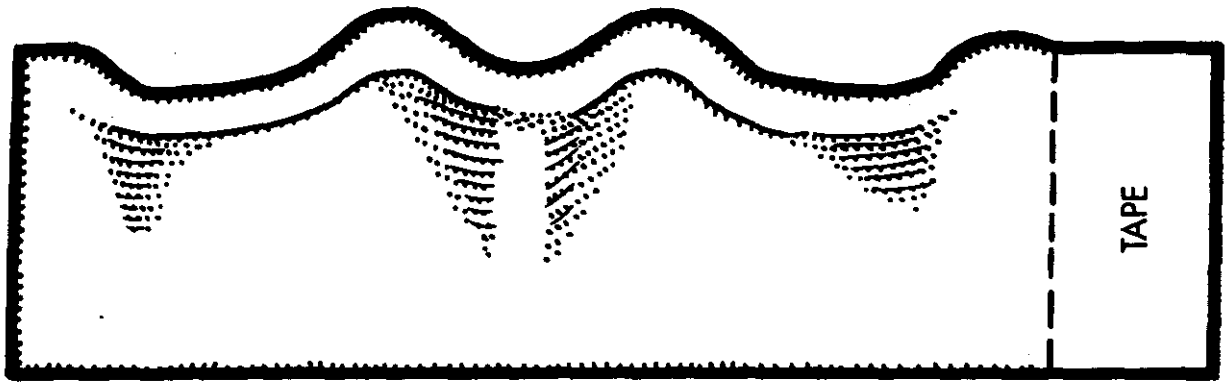
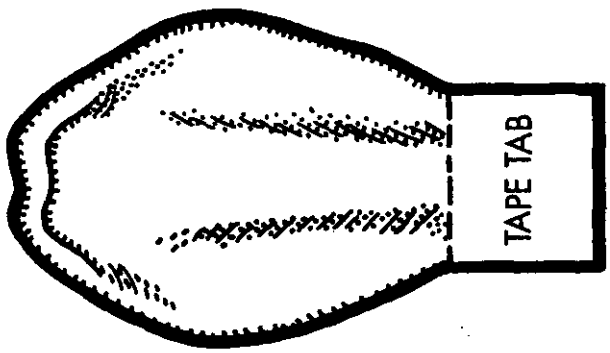




EPIGLOTTIS

How Air Moves In and Out of the Lung

Objectives:

To assist pupils in the intermediate grades develop an understanding of the respiratory system.

To demonstrate how air enters and leaves the lungs.

Demonstrate the relationship between the breathing rate and exercise.

Materials needed:

1. A 1-Liter plastic bottle
2. Two 15" balloons
3. Scissors
4. Two rubber bands
5. Watch with a second hand

Strategy:

A. Background

1. Discuss and label the parts of the respiratory system always using our multicultural scientific names which are the same throughout the world. (throat, larynx, trachea, bronchial tube, air sac, lung and diaphragm)
2. Trace the path of the air through the respiratory system.
3. Discuss the process of inhaling and exhaling.

B. Activities

1. Cut the bottle in half (horizontally).
2. Place one of the balloons through the opening of the bottle.
3. Stretch the balloon opening over the bottle opening.
4. Place a rubber band over the balloon to keep it in place.
5. Cut the neck off the other balloon and stretch this balloon across the bottom of the bottle.
6. Use a rubber band to hold the balloon in place.
7. Using a watch with a second hand record the breathing rate of a person sitting (1 min.), walking (2 min.), and jogging in place (2 min.).

Performance Assessment:

Thinking of the balloon in the opening of the bottle as the lungs and the balloon across the bottom of the bottle as the diaphragm, pull down on the stretched balloon - record your finding. Pull very slowly on the stretched

balloon - record your finding. Next, pull down faster on the stretched balloon- record your finding. Using the results from your findings to answer the following questions:

1. What happens to the balloon in the bottle?

2. How does air move in and out of the lungs?

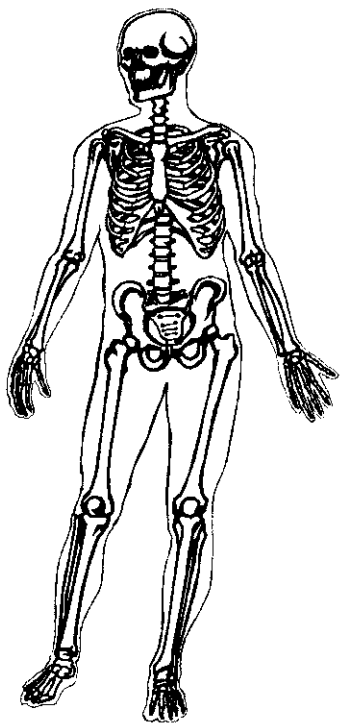
3. What large muscle is important in inhaling and exhaling?

4. Does breathing rate increase with exercise?

Conclusions:

The balloon in the bottle opening fills with air when you pull down on the stretched balloon across the bottom of the bottle. When you let go of the balloon across the bottom, the air in the balloon in the opening is pushed out. Air moves in or enters the lungs when the diaphragm moves up (inhaling). Like the heart rate, the breathing rate increases with exercise.

Skeletal System



Abby Schortgen
April Kuehnert
Nikki Dammeier

Names: Abby, April, Nikki
Subject: Health
Lesson Topic: Bones

INTASC Principal: The professional educator understands content.

IN State Standards:
Health Standard 1
Student will comprehend concepts related to health promotion and disease prevention.
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
The Living Environment
Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environment.

IN State Sub-standards:
5.1.4 Describe the basic structure and functions of the human body systems.
5.4.9 Explain that like other animals, human beings have body systems.

Annotated Bibliography:

Informational Sources

KidHealth. The Big Story on Bones.
http://www.kidshealth.org/kid/body/bones_noSW.html
This website was helpful while gathering basic information about bones. It has interactive links for extensions as well.

Silver, Donald M. and Wynne, Patricia J. The Body Book. Scholastic Professional Books (p 49-68) 1993.
This book is full information about how the body works and the functions of all of the different body systems. It can be found at Shared Information Services in Burris Laboratory School.

Instructional Sources
Biel, Andrew R. Dorn, Robin. *Trail Guide to the Body: How to Locate Muscles, Bones & More!* Books of Discovery; (September 1997)
This is a hands on guide book to the body and a way for children to locate muscles and bones. This book is available on Amazon.com.

Learning the Skeletal System- An Educator's Reference Desk Lesson Plan.
http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lessons/ Science/Anatomy/ANA0009.html
This lesson is designed to teach the skeletal system in an interactive way. It is available at the web site listed.

Lesson Plan
(Bones Day 1)

IN State Standards: Students will comprehend concepts related to health promotion and disease prevention. Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
The Living Environment
Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use appropriate tools in identifying similarities and differences among these organisms. Students explore how organisms satisfy their needs in their environments.

IN State Sub-standards:
5.1.4 Describe the basic structure and functions of the human body systems.

5.4.9 Explain that like other animals, human beings have body systems.

Objectives: Students will know and be able to label parts of a long bone.
Students will be able to answer questions in a game about bones.
Students will make a model of a long bone.

Materials: Microscopes, cross sections of various types of bones, bone parts diagram,

New Information:

- Bones are made of living cells and hardened minerals like calcium.
- Bones are where red blood cells are made and stored.
- The three parts of a long bone are the compact bone, spongy bone, and hollow shaft.
- Compact bone is the hard outer covering that supports and protects the bone.
- Spongy bone is softer than compact bone and acts as a cushion incase of impact.
- Inside the hollow shaft there is more bone marrow and fat, this is where the red and white blood cells and plasma are made.
- Plasma is the liquid part of blood, it is usually clear and contains platelets that help blood to clot if the skin is broken.
- Bones can grow at both ends and in diameter.

- 18% of our body's mass is made up of your bones....we can find the mass of our skeleton.
- Bones are hollow because if they were solid they would be much too heavy.
- Calcium rich foods like milk and cheese make our bones strong and keep them healthy.

Motivation: I will bring in a blob of clay or play dough and put 2 eyes on it. I will ask the students what they think I am trying to represent. I will explain that this is what we might look like if we did not have bones in our bodies. I will tell the students: "Today we are going to talk about our bones. We will see what our bones are made of and what they do for us." **(Goal for Learner)**

Procedure:

1. I will tell the students that bones are made of living cells and deposits of hardened minerals like calcium.
2. We will talk about the three parts of a long bone: the compact bone, spongy bone, and hollow shaft.
3. Compact bone is the hard outside part that protects the inside of the bone where red blood cells are being produced and stored.
4. Spongy bone is like a cushion for the hollow shaft, it protects the inside blood cell "factory" from impact when you are outside playing or doing your chores.
5. Bone marrow is a thick, spongy kind of jelly inside your bones. Bone marrow makes all kinds of blood cells: red blood cells that carry oxygen, white blood cells that fight infections, and platelets that help blood clot.
6. **Modeling:** Together the students and I will look at a transparency of an unlabeled bone. I will show them where each part of the bone is and what it covers. We will do this while discussing the functions of each part. **(Nonlinguistic Representation/Instructional Strategy)**
7. **Guided Practice:** Now the students will be put into pairs and prepare to look at a cross section of a long bone under the microscope. They will draw what they see and then they will label the picture according to the parts of the bone and the functions. The college teachers will be walking around to assist the students to make sure they are looking at the correct parts. **(Cooperative Learning/Instructional Strategy)**
8. **Check for Understanding:** As the students work it will be a good time to ask the students questions about bones and what they have learned. I will ask if anyone has ever had a broken bone and what it looked like and felt like. Also we will talk about how long it took to heal and what can make bones heal faster (foods rich in calcium). Younger bones also heal faster than those in older people.

9. **Practice/Application:** The students will now make a model of a long bone. They will cut out the two parts of the model, attach them, and then label the different parts.
10. **Closure:** We will discuss how important it is to eat and drink things that help the bones stay healthy. I will give them some examples of food that would be rich in the nutrients such as calcium.

Lesson Evaluation:

Name:	Student can label the parts of a long bone.	Student can list the functions of each part of the bone.	Student know some foods and exercises that can help keep bones healthy.

Lesson Extension:

We will take a bone that I acquire from the butcher shop and look at it together. The bone will be from a cow or a pig so we will be able to see without a microscope the different parts. I will have had the butcher cut it length-wise and we will gather together to make sure that each student gets a chance to see the bone. I will make sure that everyone knows what we are looking at and if they do not feel comfortable watching they will be excused.

Lesson Plan
(Bones Day 2)

IN State Standards: Students will comprehend concepts related to health promotion and disease prevention. Health Standard 1
Students develop knowledge of the importance of assuming personal responsibility for health behaviors, the relationship between health behaviors and health, interrelationships between the dimensions of health, the basic structure and functions of body systems, the influence of external factors on health, causes of disease, ways to prevent injury and illness among adolescents, and basic health terms and concepts.

Science Standard 4
The Living Environment
Students learn about an increasing variety of organisms – familiar, exotic, fossil, and microscopic. They use
appropriate tools in identifying similarities and differences among these organisms. Students explore how
organisms satisfy their needs in their environments.

IN State Sub-standards:
5.1.4 Describe the basic structure and functions of the human body systems.

5.4.9 Explain that like other animals, human beings have body systems.

Objectives:
Students will label major bones in the body
Students will play "Simon Says" using the names of the bones as directions.
Students will assemble and label a paper model of a skeleton

Materials/Media:
Bone cut-outs, bone poster with labels, skeleton, scissors, brads, skeleton outline, labeled and unlabeled poster, list of bones.

New Information:
- An adult body has 206 bones.
- A new born baby has 270 bones, but some fuse together as the baby grows.
- Bones provide structure and support for our bodies.
- Bones also protect internal organs.
- Red blood cells are produced and stored inside your bones, in the bone marrow.
- Your axial skeleton includes all of your bones except your arms and legs. Some of these include: ribs, skull, and pelvis. Within these bone groups are several smaller bones.
- Your arms and legs are part of the appendicular skeleton, that is why we call the arms and legs "appendages".

- Your bones are made up of living cells and held together by calcium deposits. It is important to eat foods high in calcium to help keep your bones strong and healthy.

Motivation:

I will have the skeleton covered in a sheet in the front of the classroom. **(Nonlinguistic Representation/Instructional Strategy)** This will spark the students curiosity because they will not know what is under the sheet. Before we begin I will give them clues to what is under the sheet and hopefully they will figure it out. Once I uncover the skeleton I will tell the students: "Today we are going to look at the skeleton and talk about its functions and some of the specific bones that make it up. **(Goal for Learner)**

Procedure:

1. I will start out with the skeleton in front of the class and ask them what they think their bones do for them. The answers that I receive should fit into the categories of supporting and protecting the body and internal organs.
2. After we discuss the function of the bones I will have the students take turns telling me which bones they already know. I hope that they know several, I think they will know more than they realize.
3. The students will probably name the common names for groups of bones, and I will sued the skeleton to show them how many bones might make up an arm or leg. As I show them the skeleton I will be able to be very specific and use scientific names for the bones.
4. **Modeling:** As the students name the bones I will ask them to point them out on the skeleton with my help. I will ask the whole class to repeat the name of the bone and point to it on their own body.
5. **Guided Practice:** I will next pass out the labeled skeleton to each student and as I go through the bones on the skeleton in front of the room they will be able to locate them on the paper. We will talk about each bone and what organs it might protect or what parts of the body it supports.
6. **Practice/Application:** To help the students to begin memorizing the names of the bones I will break them into groups of three or four and have each student draw a name of a bone. The students will work together to find a silly way to help themselves and their classmates to remember where the bone is located. **(Cooperative Learning/Instructional Strategy)**
7. **Modeling:** I will give the students a couple examples that I have thought of to remember some of the bones. For example: You can wave your phalanges like a flag.
8. Each group will come to the front of the room, point out the bone and say the bone's name. Then they will tell the class how they can remember where the bone is.
9. I will explain to the students that these are only some of the bones that exist in the entire body. An adult actually has 206 bones. We did not name them all today, but we did talk about some of the bigger and more important bones.

10. **Check for Understanding:** After we have discussed each bone that the students are going to memorize, each student will receive an envelope with a cut out skeleton inside. They will begin to put the bones together to make a full skeleton like the one at the front of the class. I will put a poster with the names of the bones that I want them to know and they will be responsible for putting the skeleton together and then labeling them.
11. **Closure:** Once the students have finished they will follow my lead as they stand and point to the bones of their bodies when I name them. I will start slow so that they become familiar with the locations and then we will go into the lesson extension game.

Lesson Evaluation:

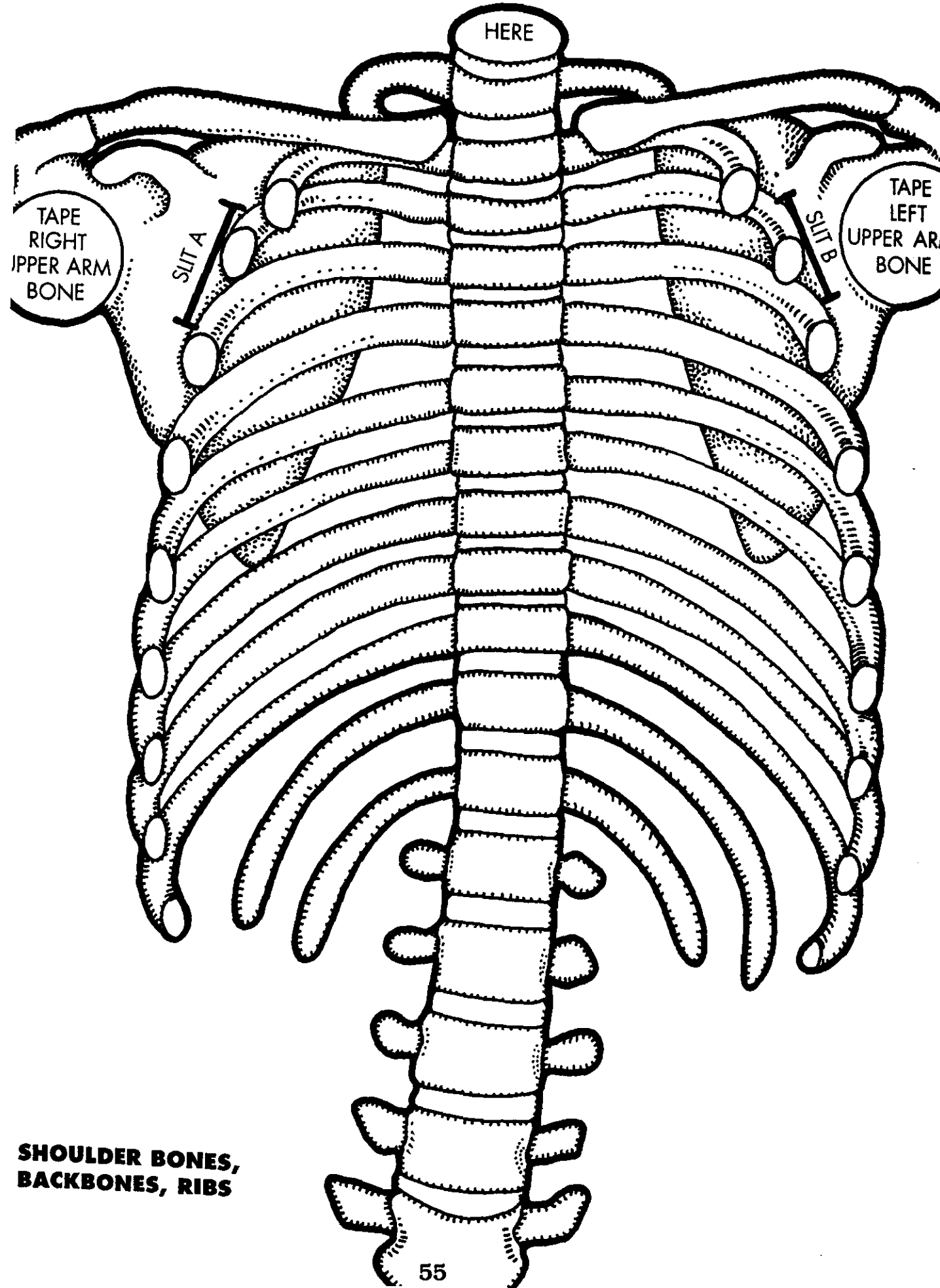
The students will be observed and evaluated on participation and completion of the activities during the lesson.

- A checkmark denotes completion

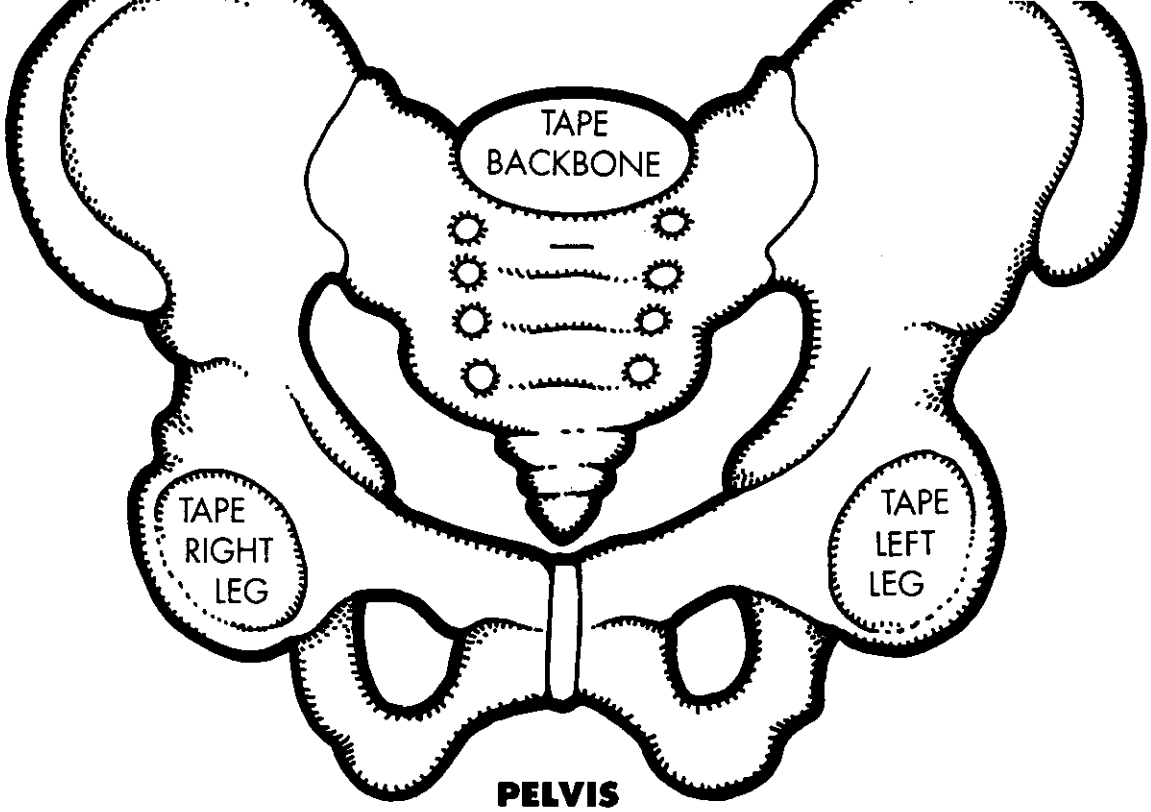
Name:	Student participated in activities.	Student labeled skeleton model correctly.	Student knows that the function of bones is to support and protect the body

Lesson Extension: The class and college teachers will play "Simon Says" using the bones. Whichever student wins the first round with me as "Simon" will become "Simon" and lead the class in their exercises. I will make sure to remind the students that exercise like this is very good for the bones.

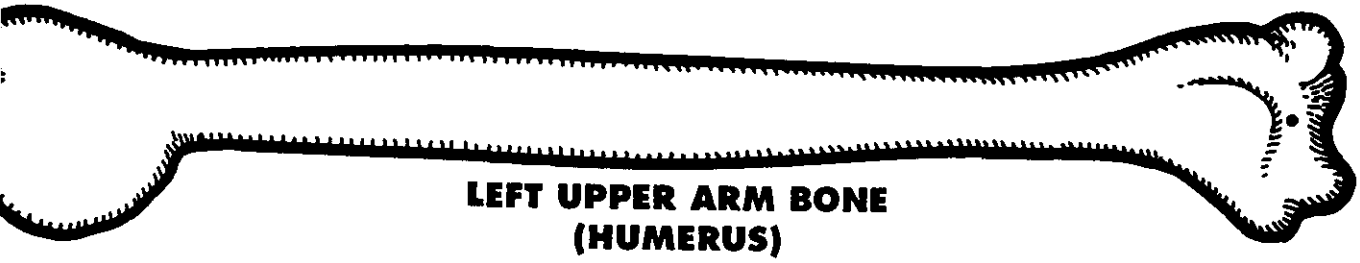
LEFT HAND
TAB
RIGHT HAND
LEFT FOOT
TAB
RIGHT FOOT
TAB



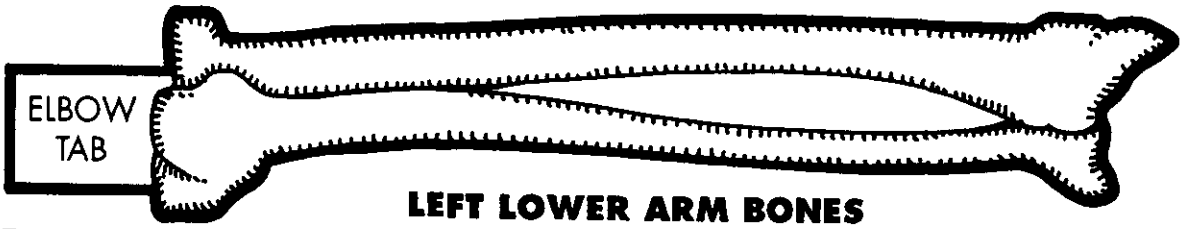
SHOULDER BONES, BACKBONES, RIBS



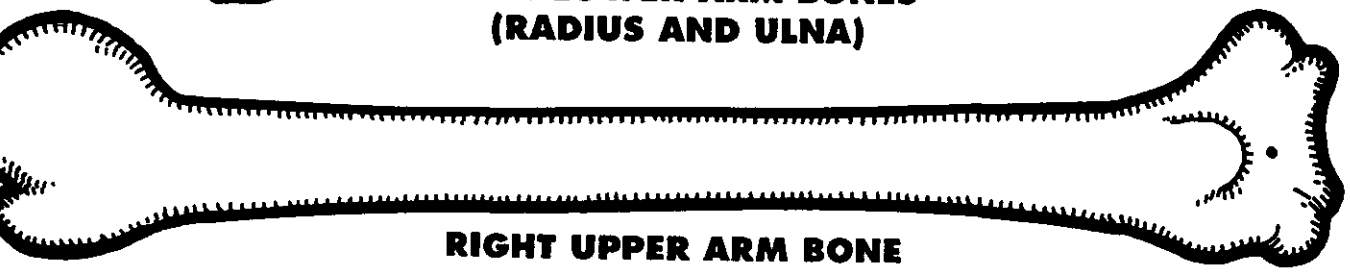
PELVIS



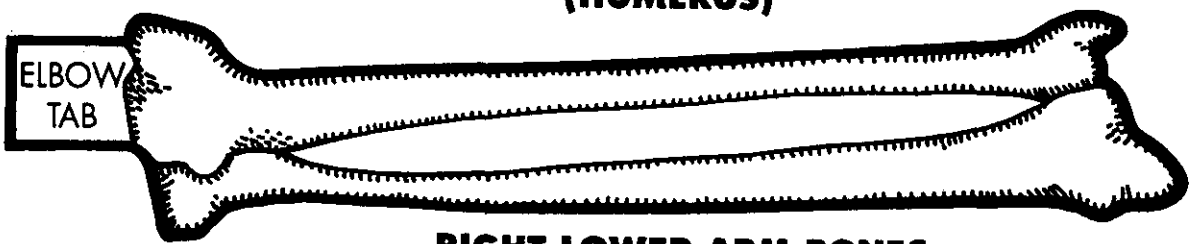
LEFT UPPER ARM BONE
(HUMERUS)



LEFT LOWER ARM BONES
(RADIUS AND ULNA)

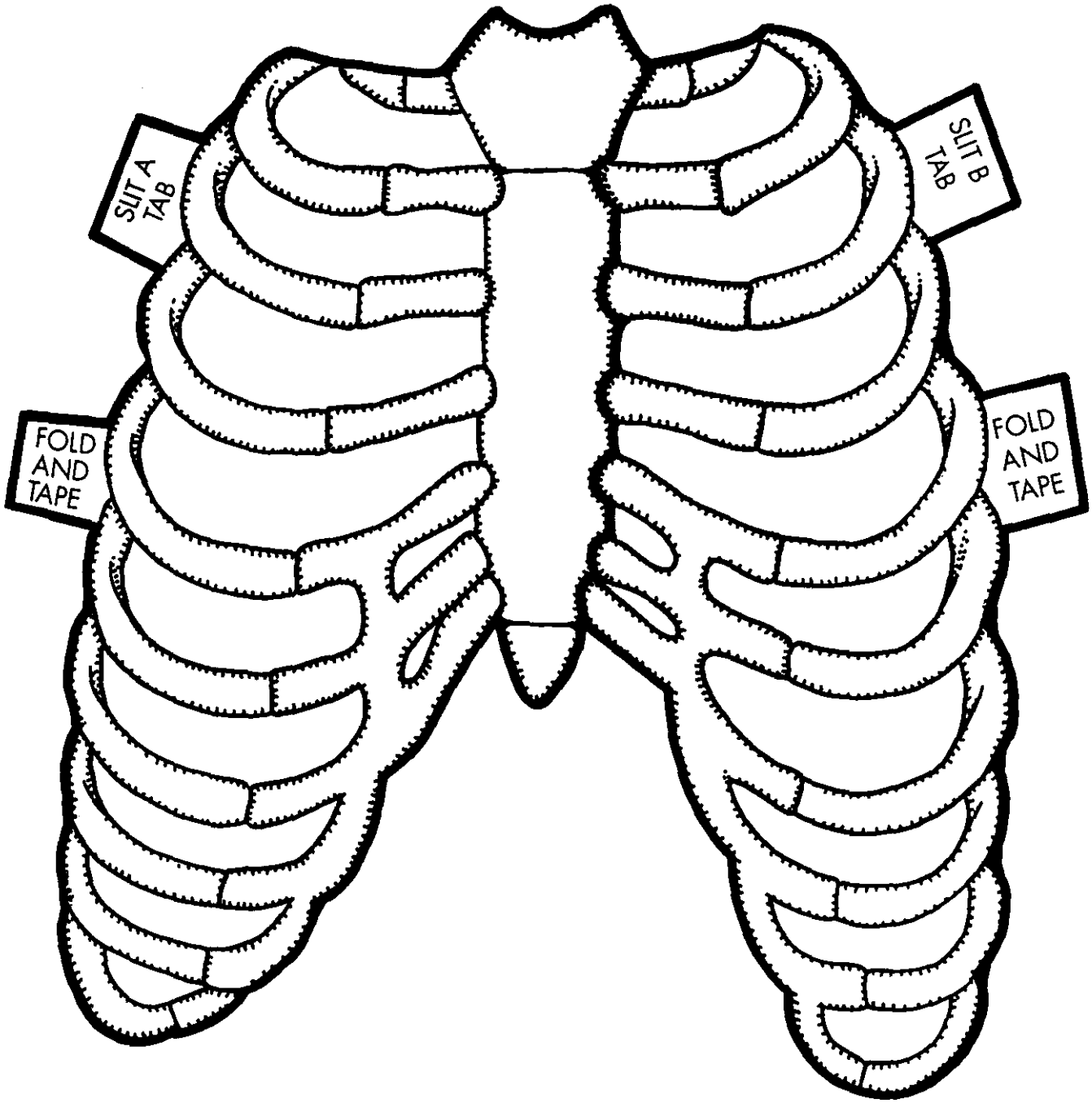


RIGHT UPPER ARM BONE
(HUMERUS)

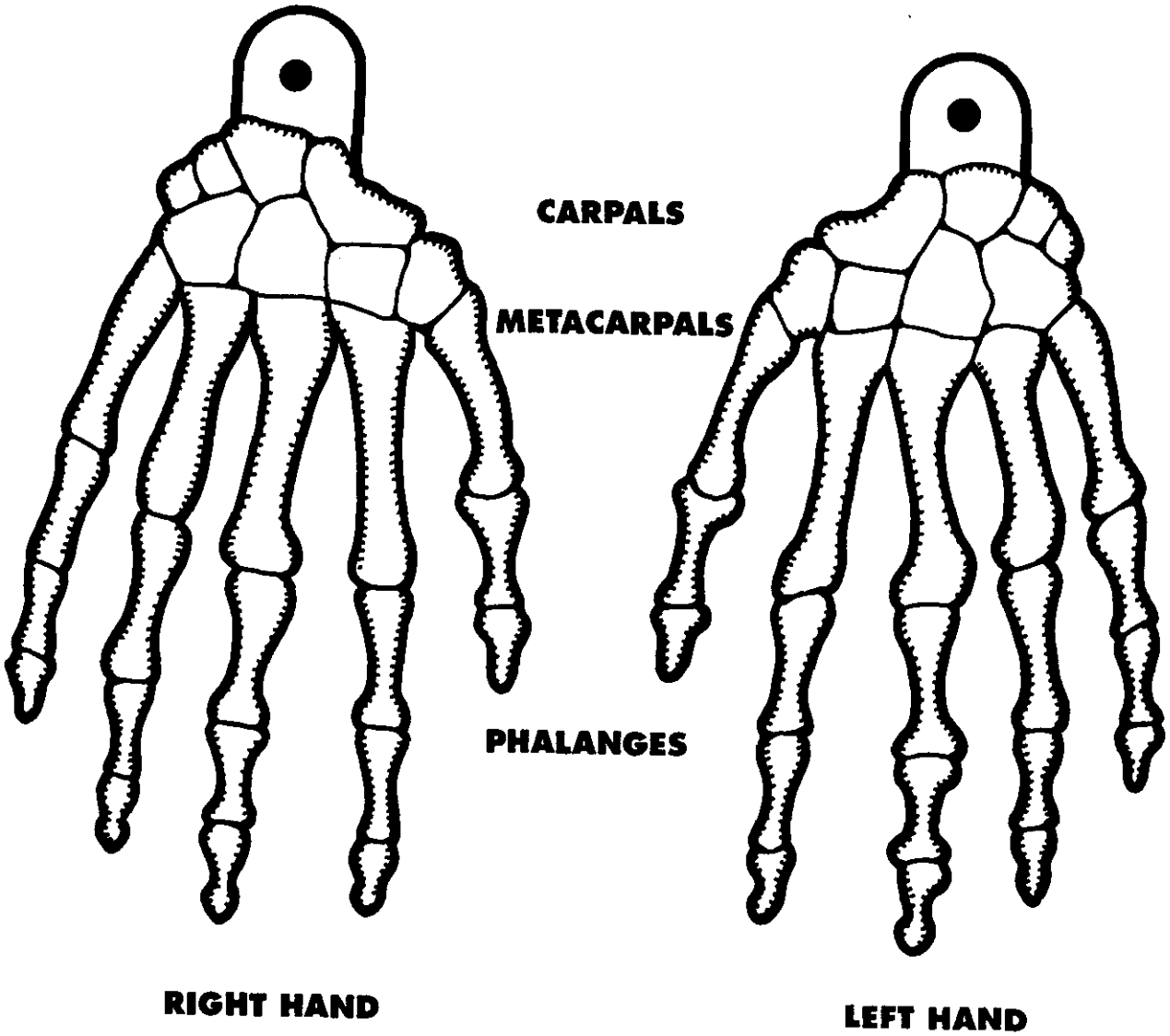


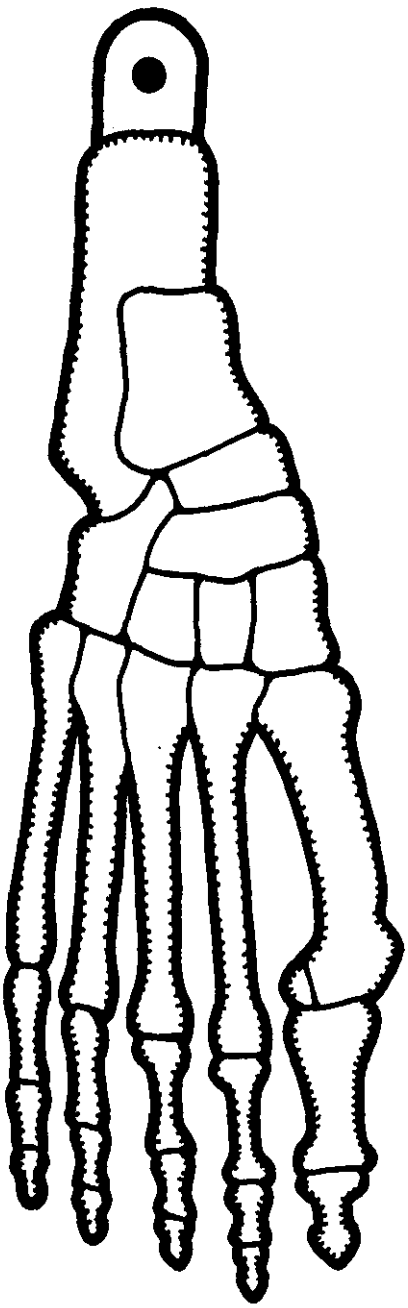
RIGHT LOWER ARM BONES
(RADIUS AND ULNA)

TAPE
KNEE-
CAP
TAPE BEHIND
RIGHT LOWER LEG BONES
(TIBIA AND FIBULA)
KNEECAP
KNEECAP
LEFT LOWER LEG BONES
(TIBIA AND FIBULA)
LEFT UPPER LEG BONE (FEMUR)
TAPE
KNEE-
CAP
TAPE BEHIND



RIB CAGE

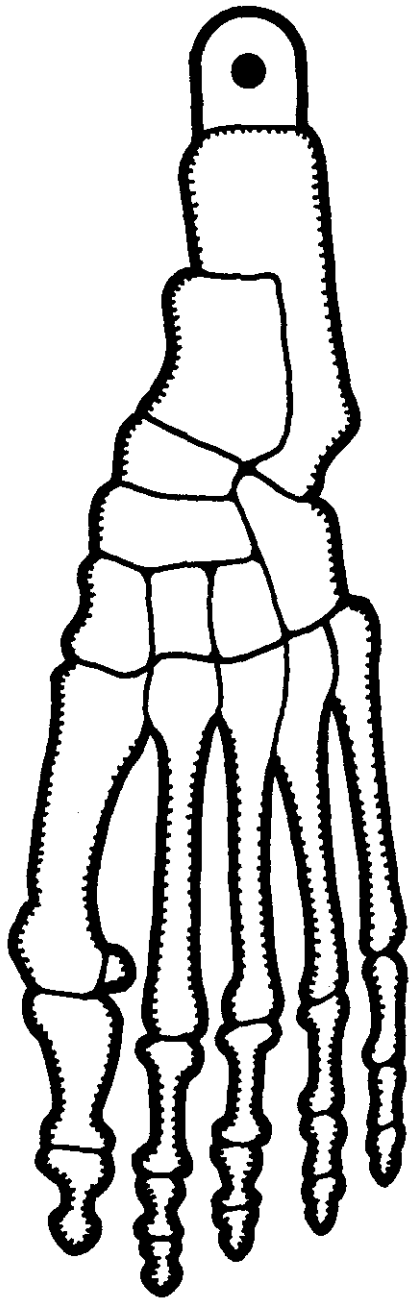

CARPALS
METACARPALS
PHALANGES
RIGHT HAND
LEFT HAND



TARSALS

METATARSALS

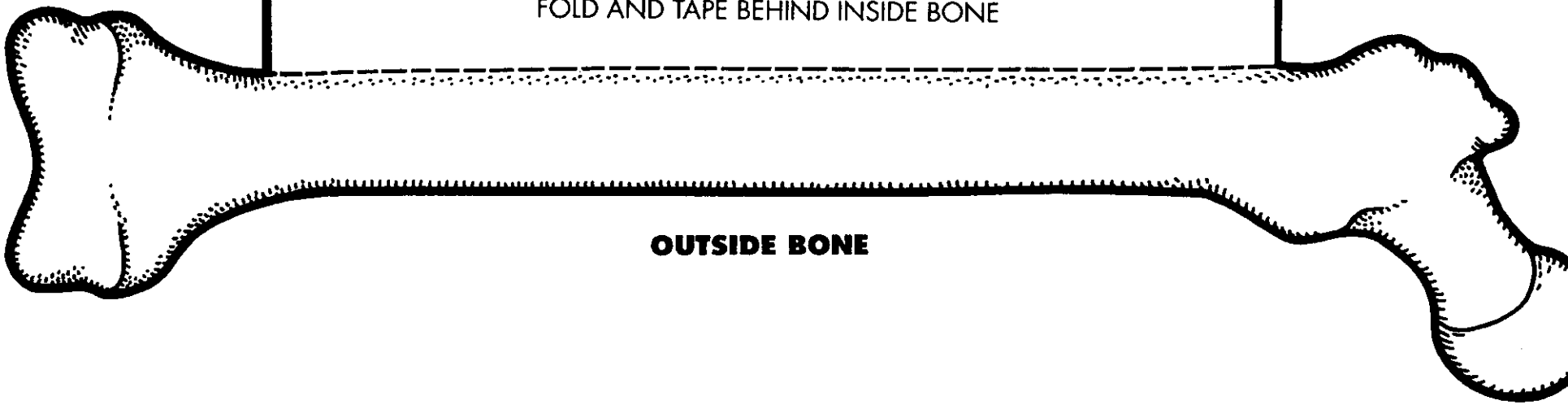
PHALANGES



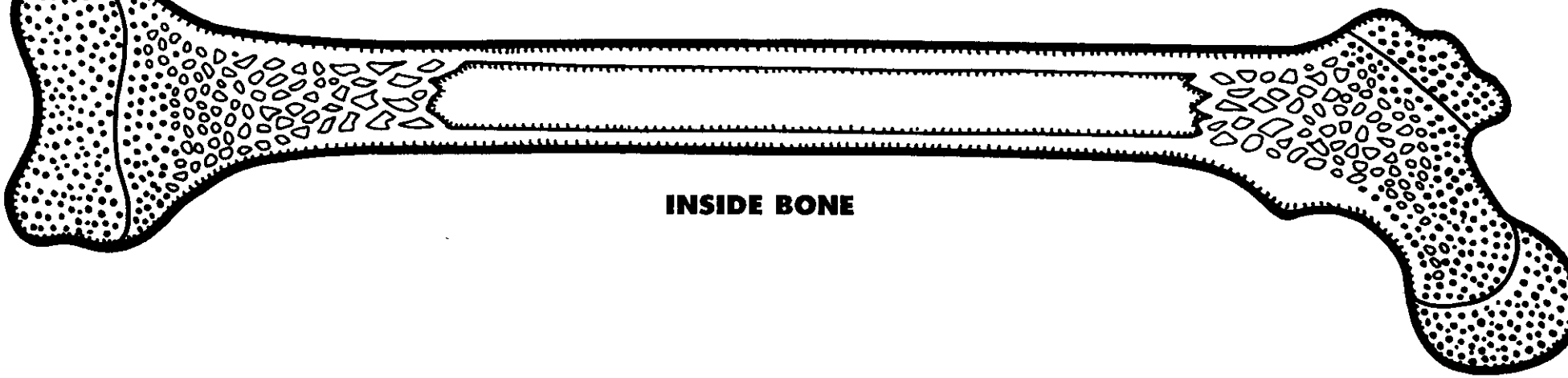
RIGHT FOOT

LEFT FOOT

FOLD AND TAPE BEHIND INSIDE BONE

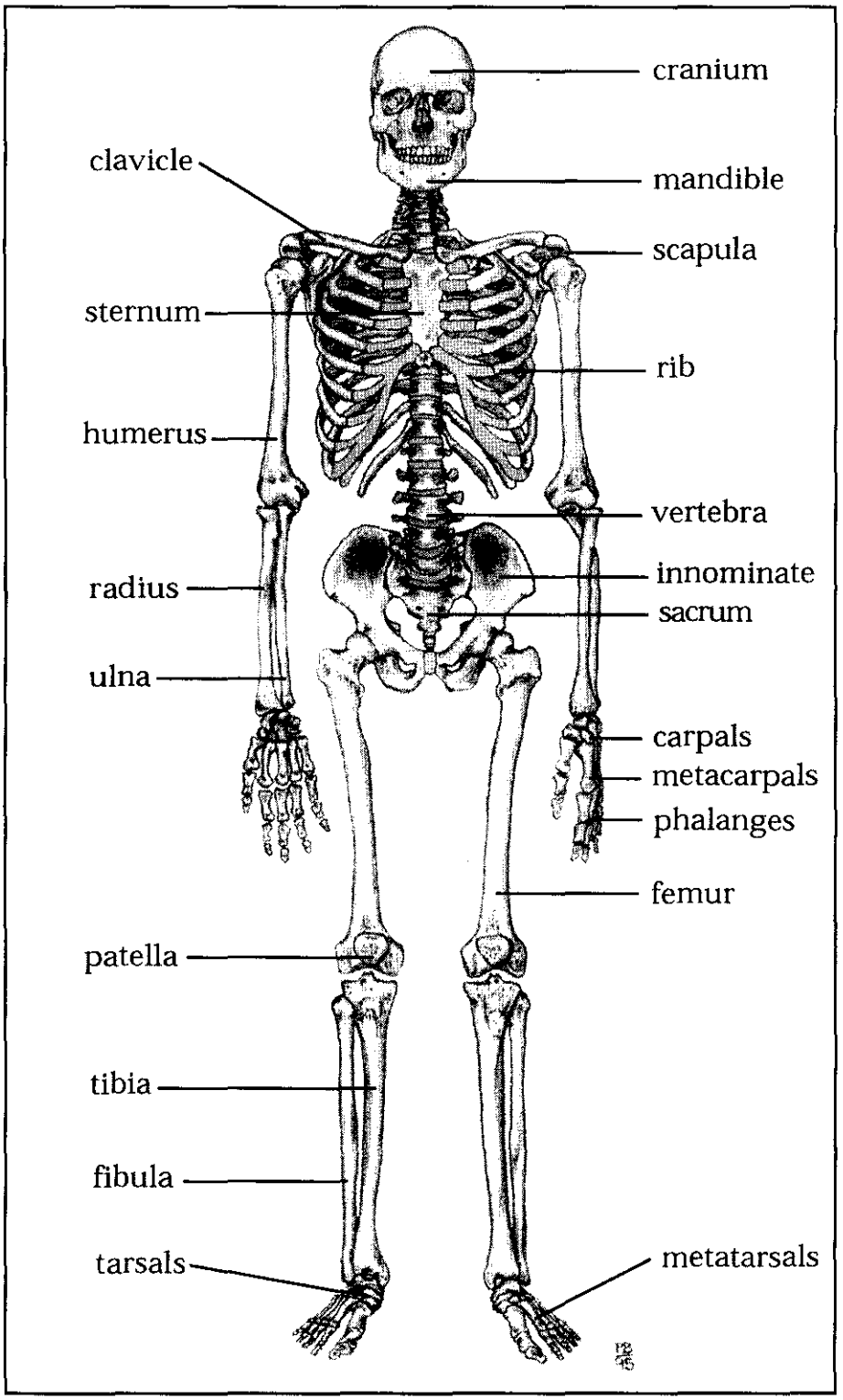


OUTSIDE BONE

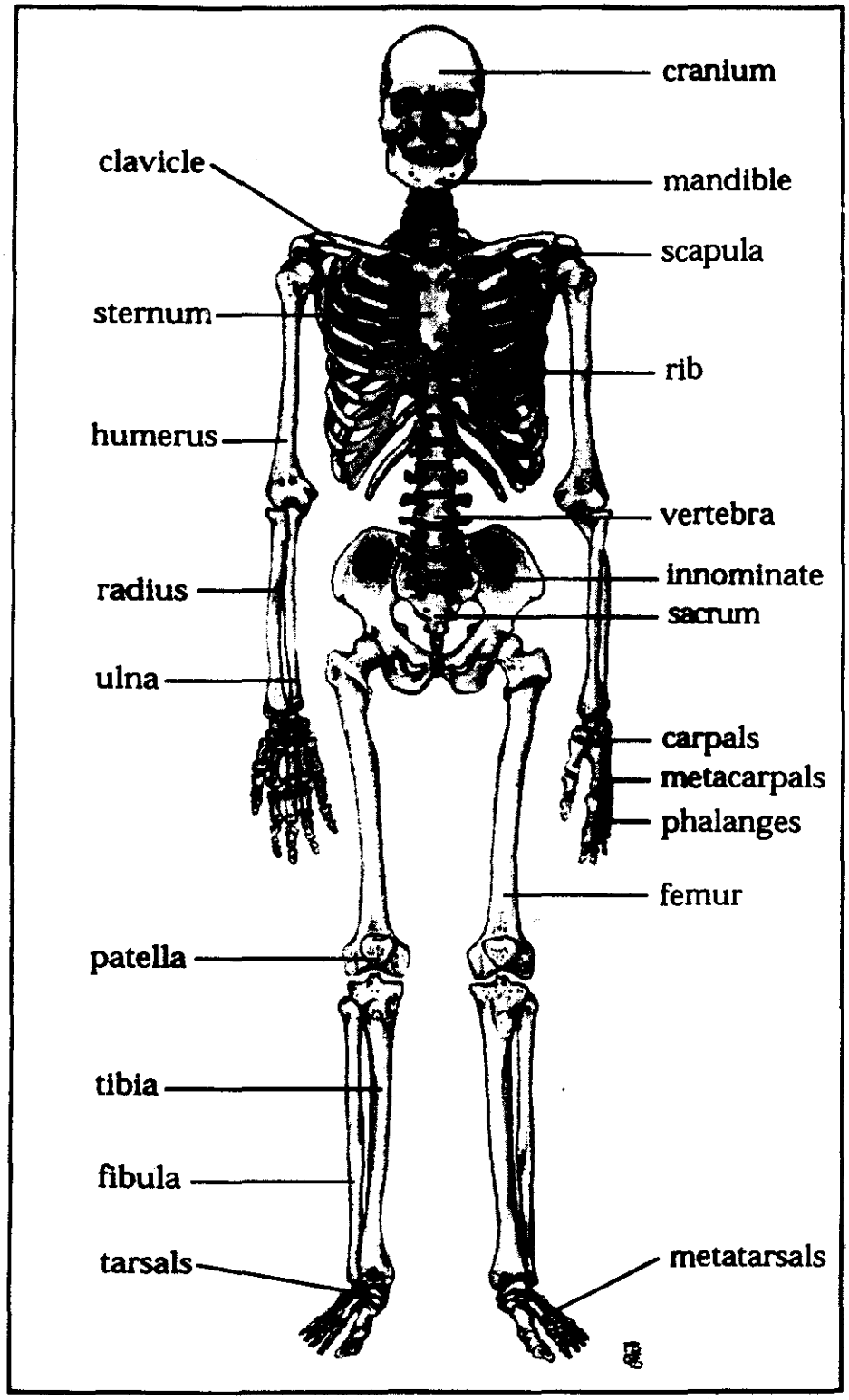


INSIDE BONE

The human skeleton
anterior view



The human skeleton
anterior view



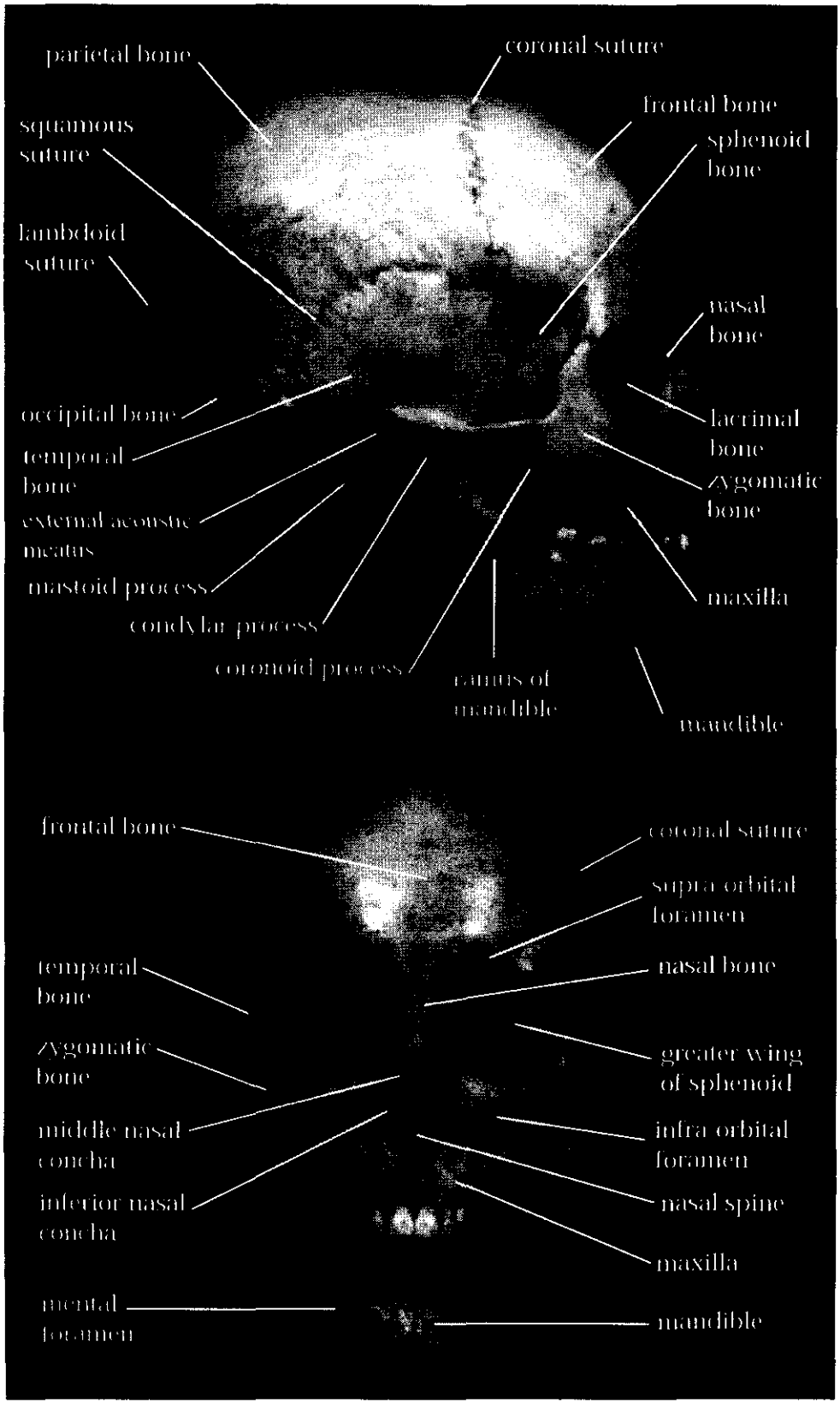


Figure 39. The cranium, lateral and anterior views.

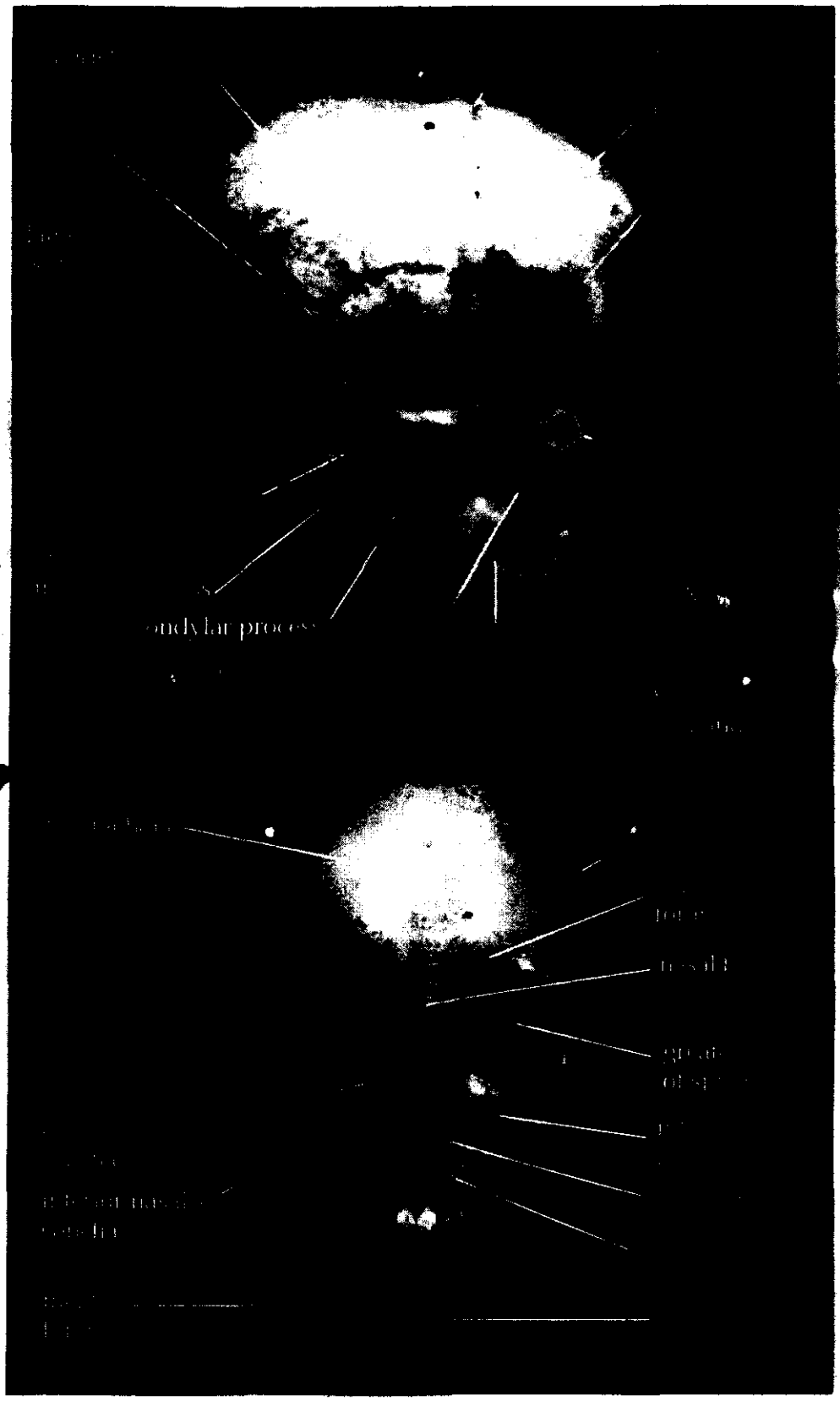


Figure 39. **The cranium, lateral and anterior** views.

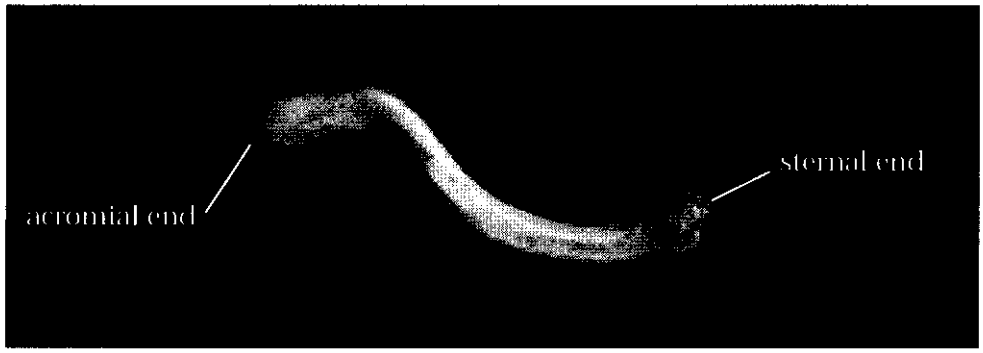


Figure 42. The left clavicle, dorsal view.

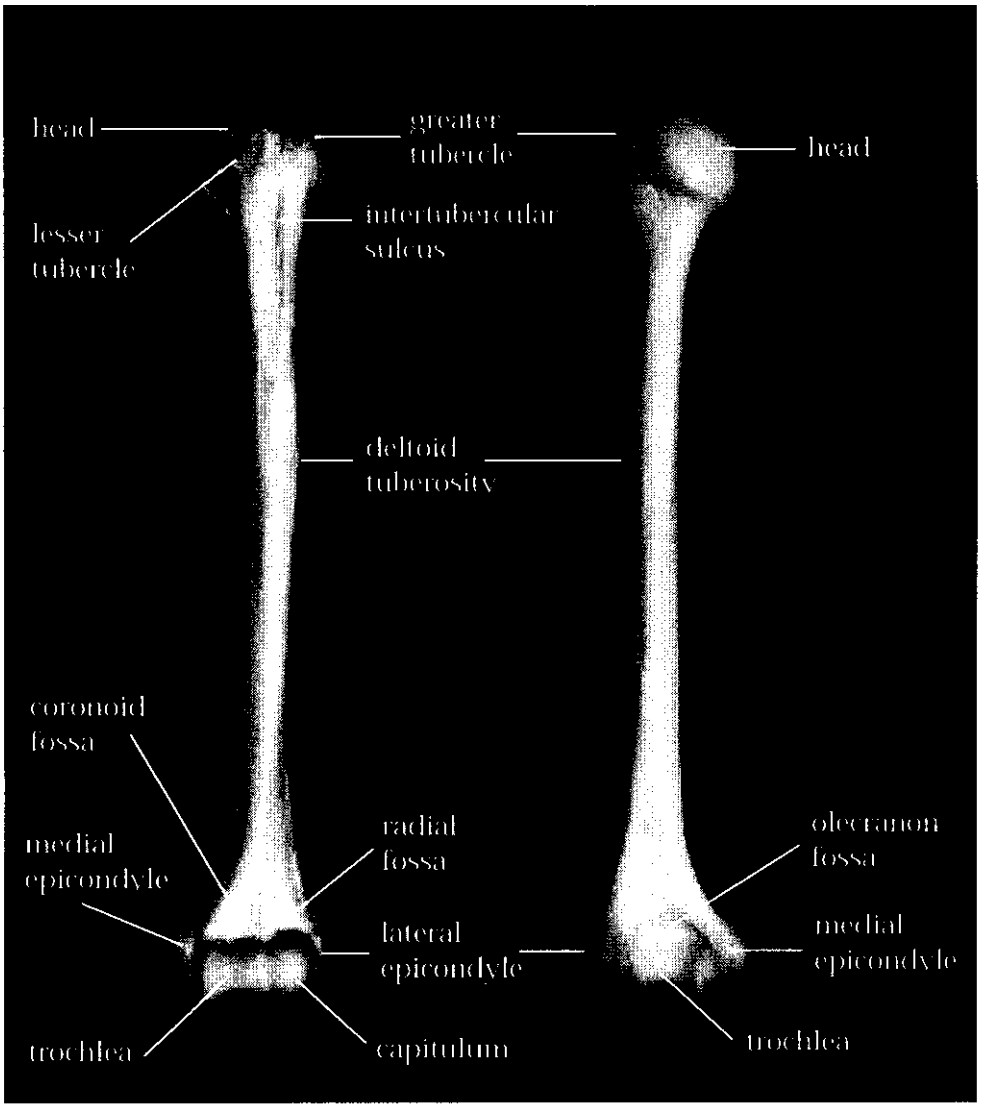


Figure 43. The left humerus, anterior and posterior views.

Figure 42. The left clavicle, dorsal view.

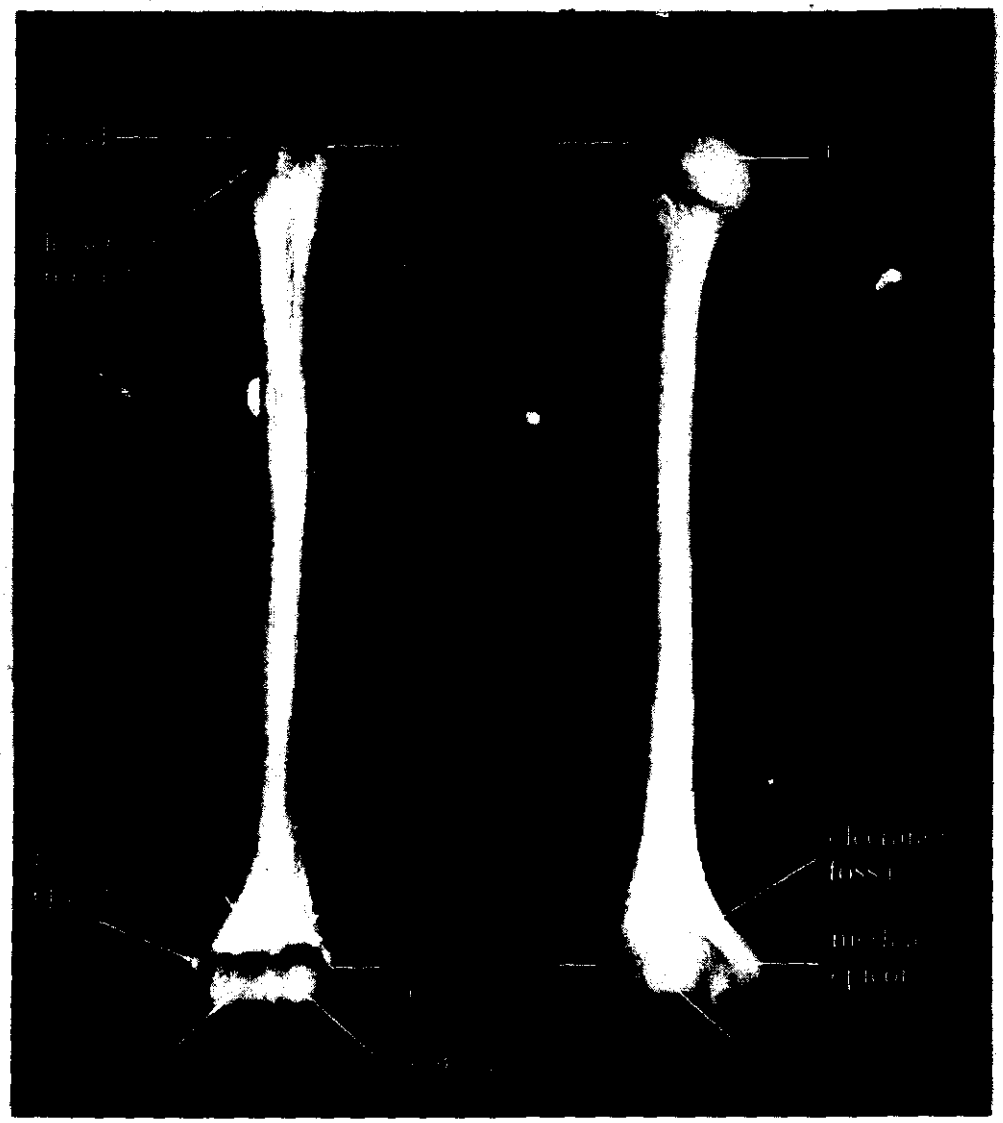


Figure 43. The left humerus, anterior and posterior views.

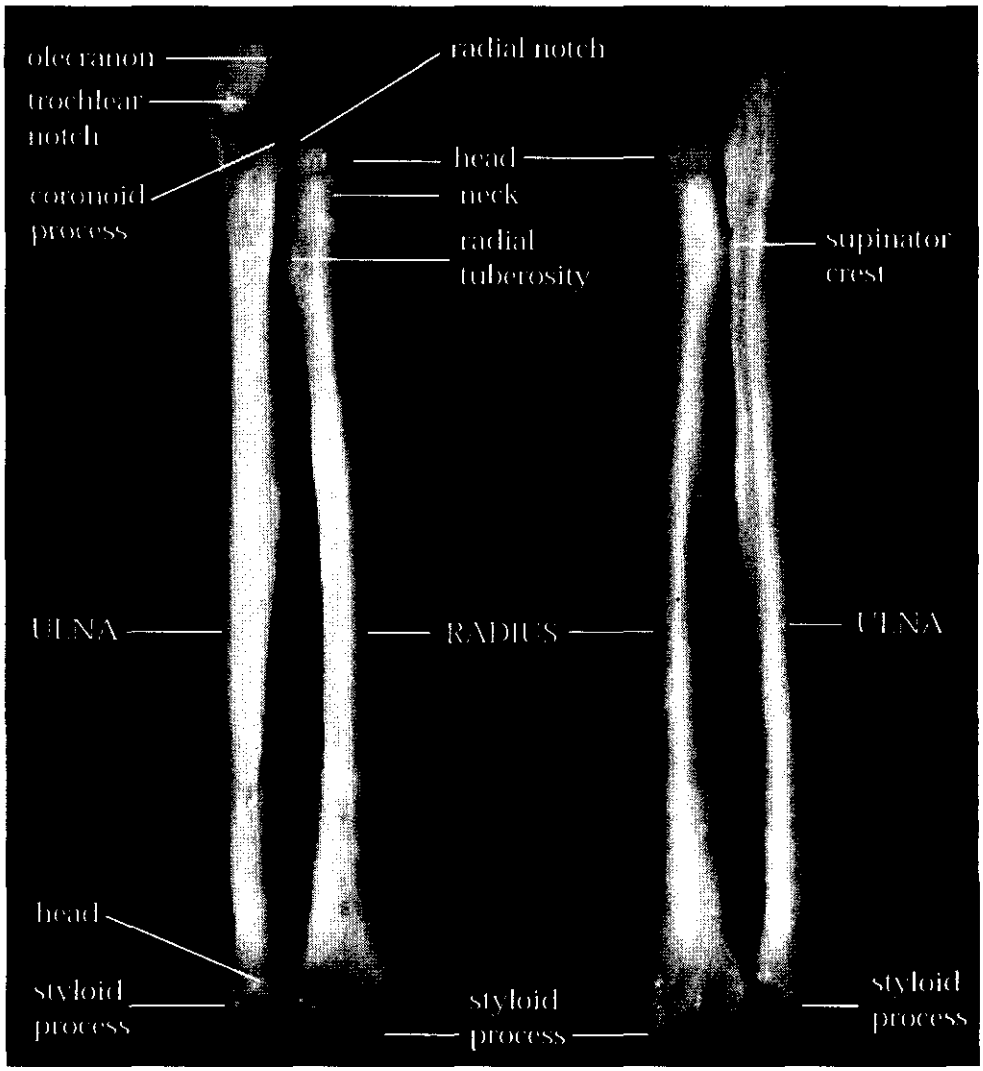


Figure 44. The bones of the left forearm, anterior and posterior views.

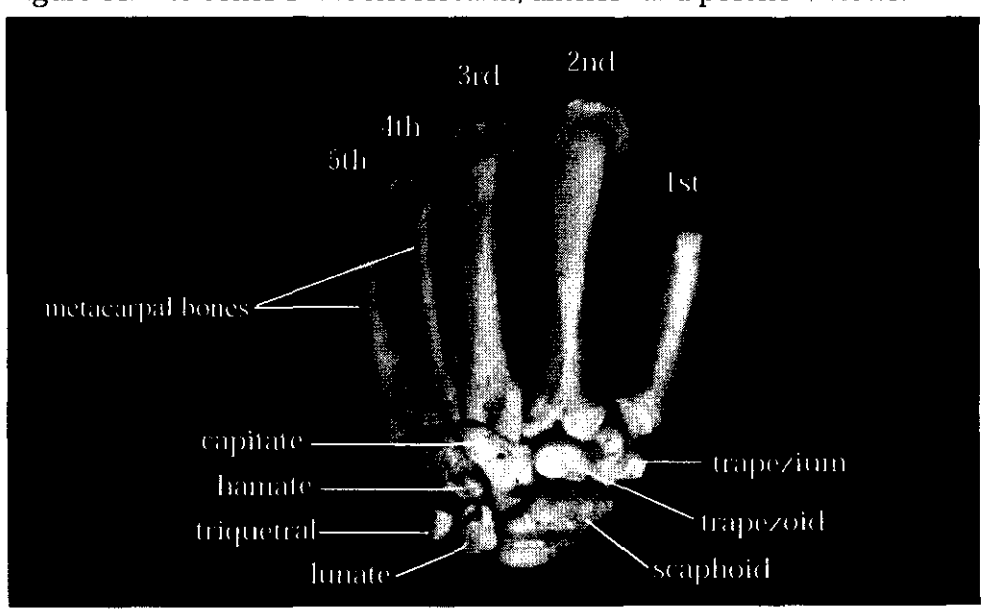


Figure 45. The carpal and metacarpal bones of the left hand, dorsal view.

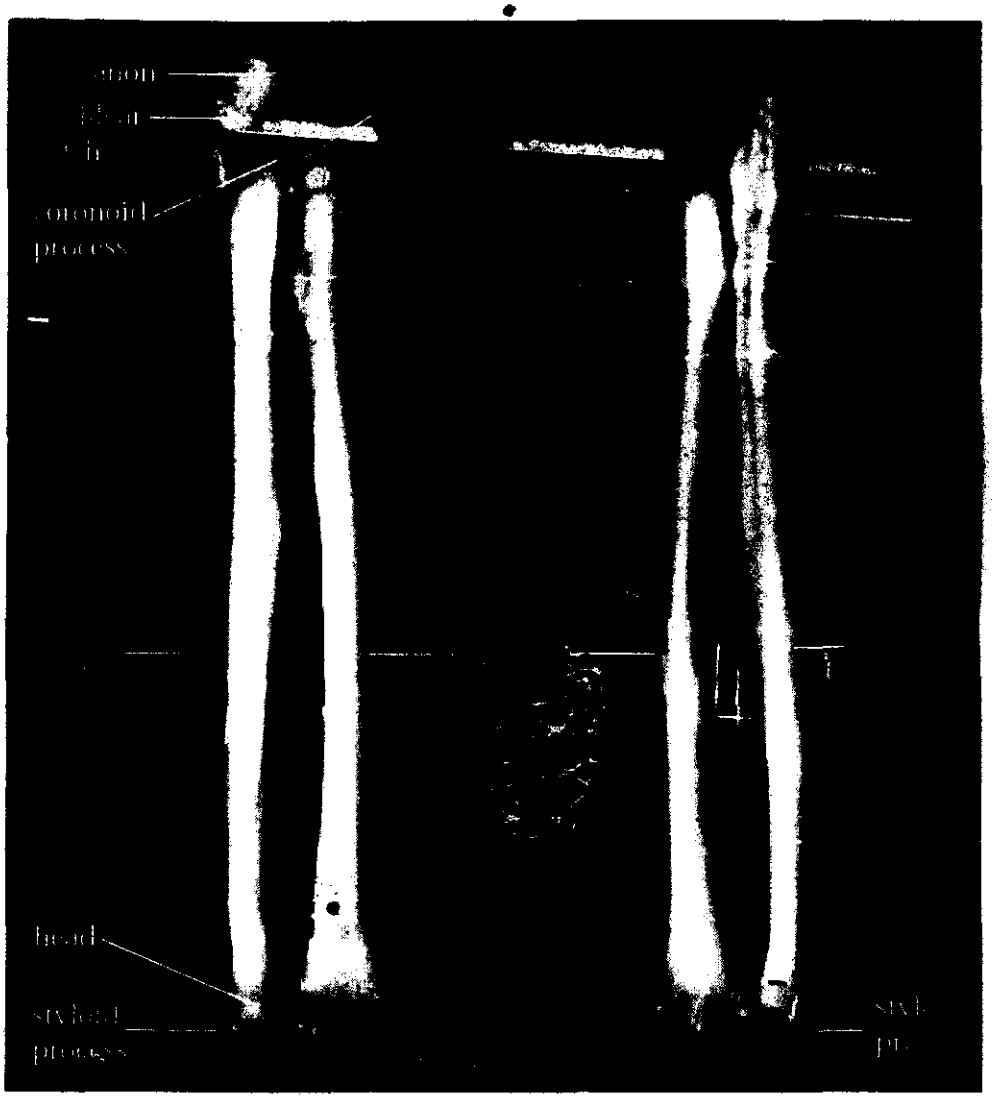


Figure 44. The bones of the left forearm, anterior and posterior views.

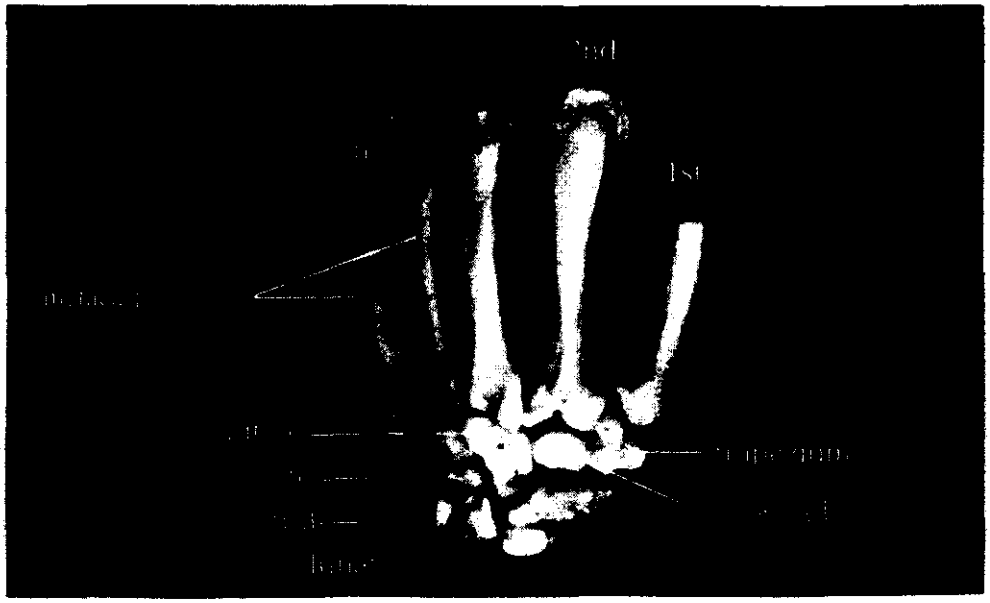


Figure 45. The carpal and metacarpal bones of the left hand, dorsal view.

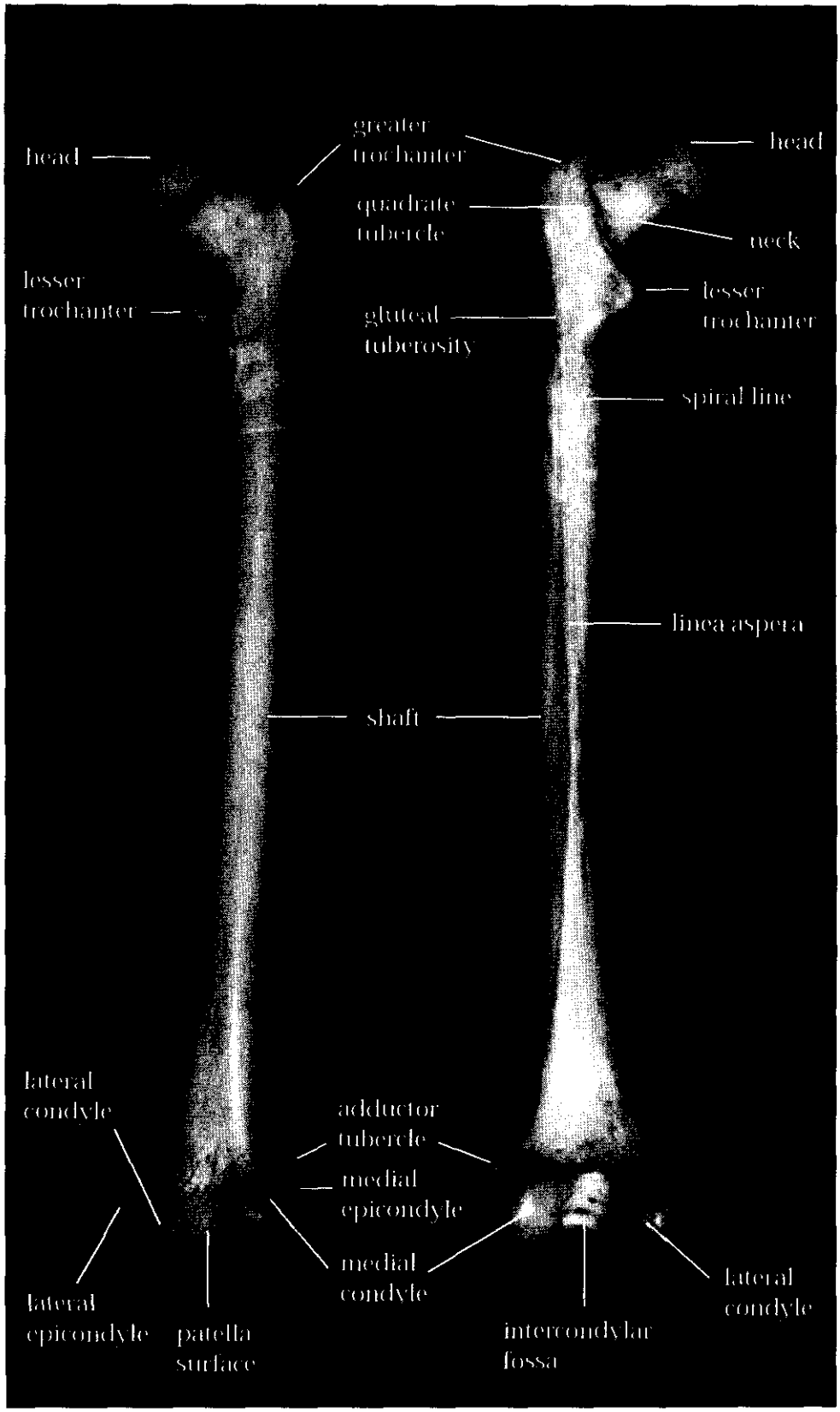


Figure 50. Left femur, anterior and posterior views.

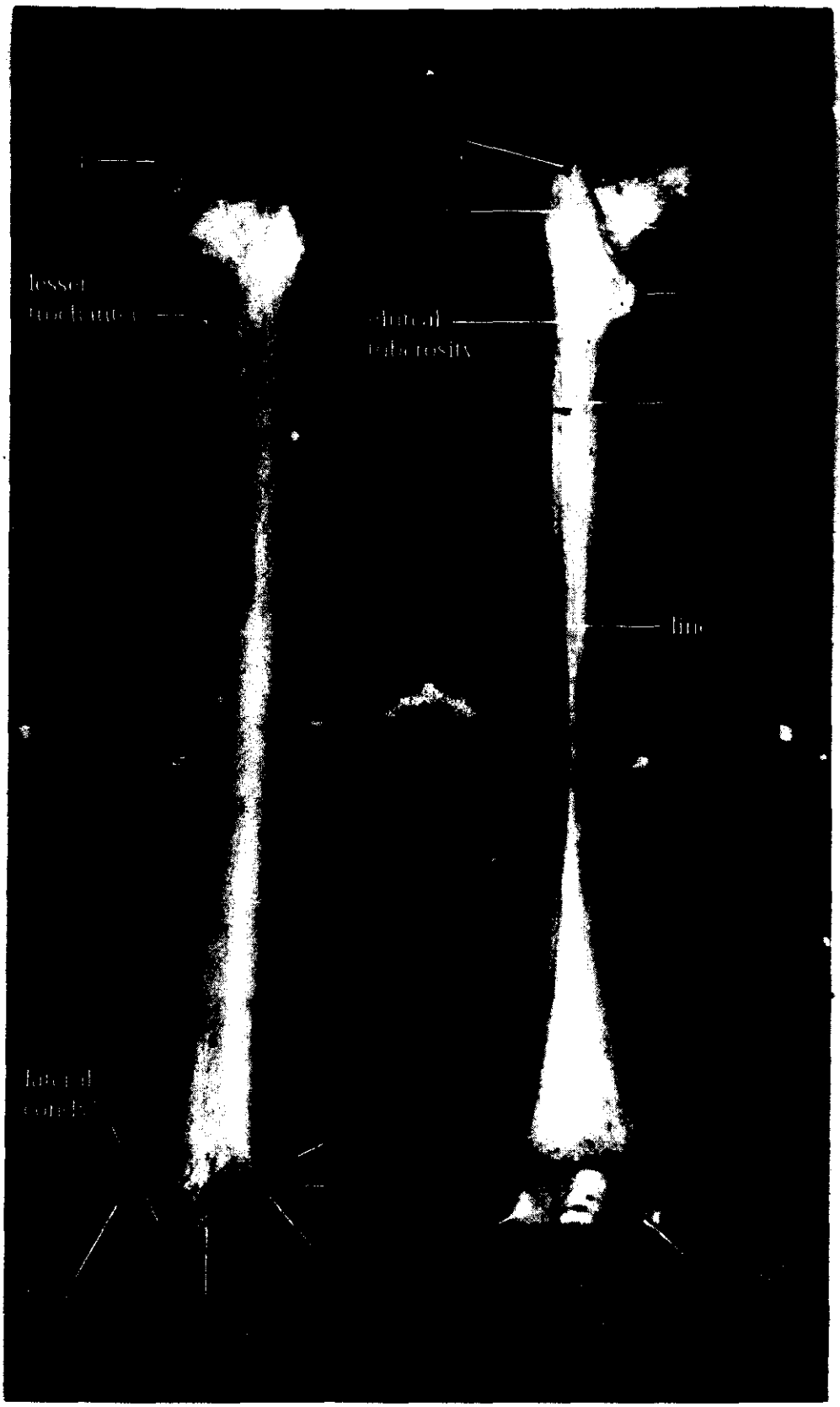


Figure 50. **Left femur**, anterior and posterior views.

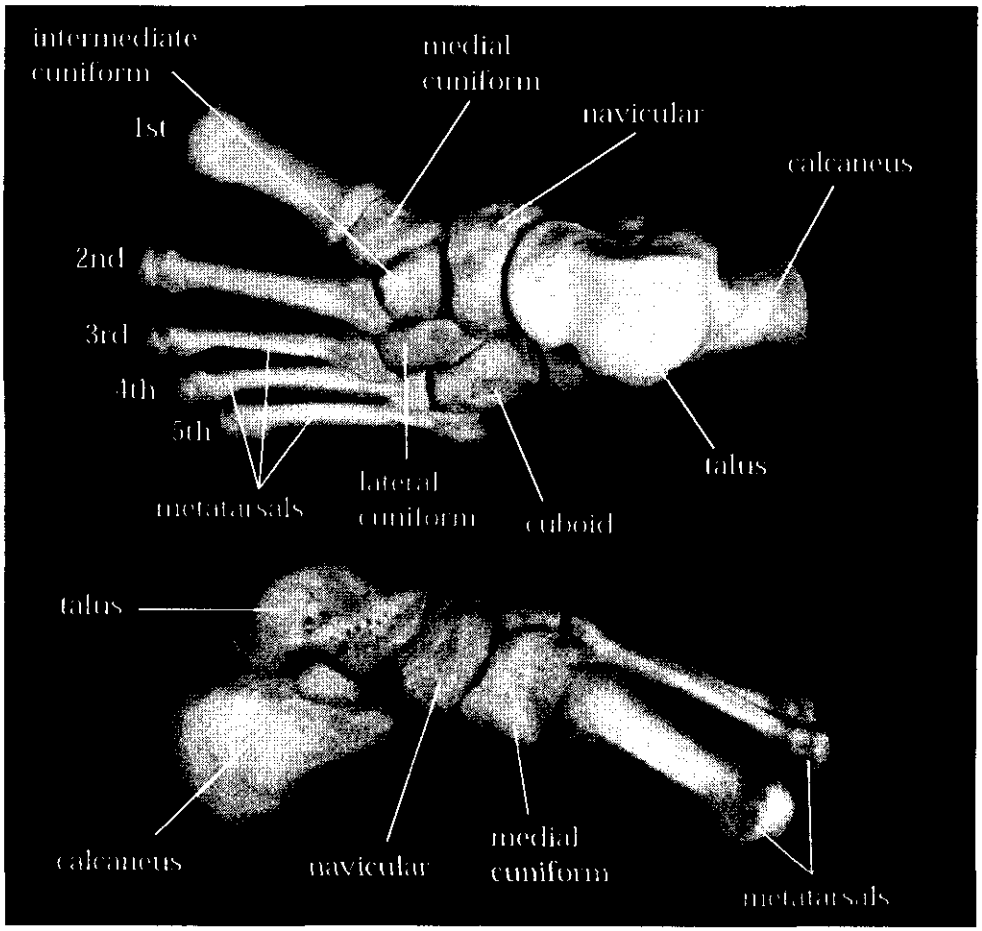


Figure 53. Superior and medial views of the tarsal and metatarsal bones of the left foot.

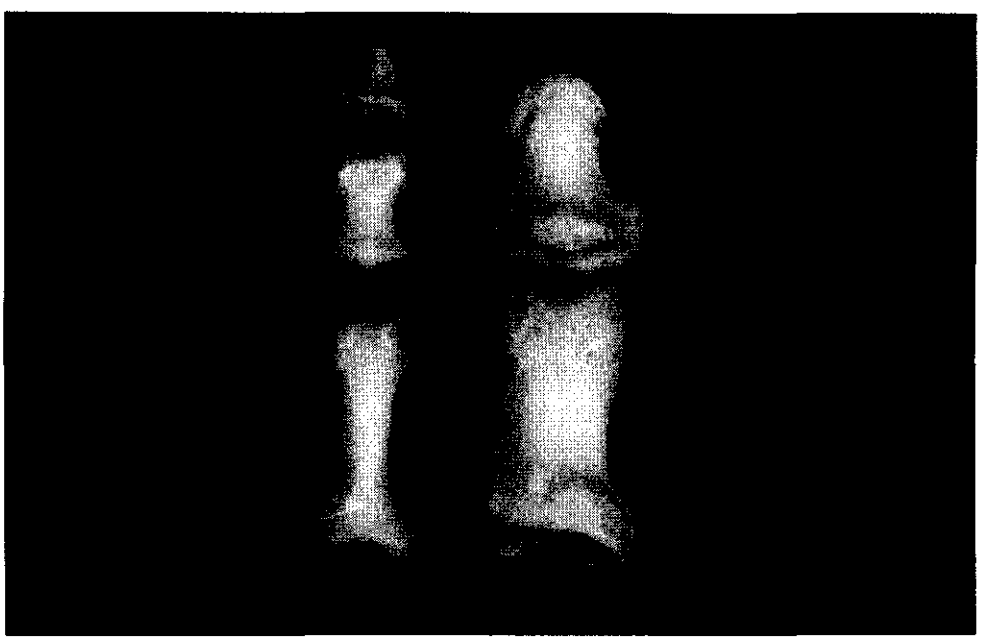


Figure 54. Superior view of the phalanges for the first and second toes.

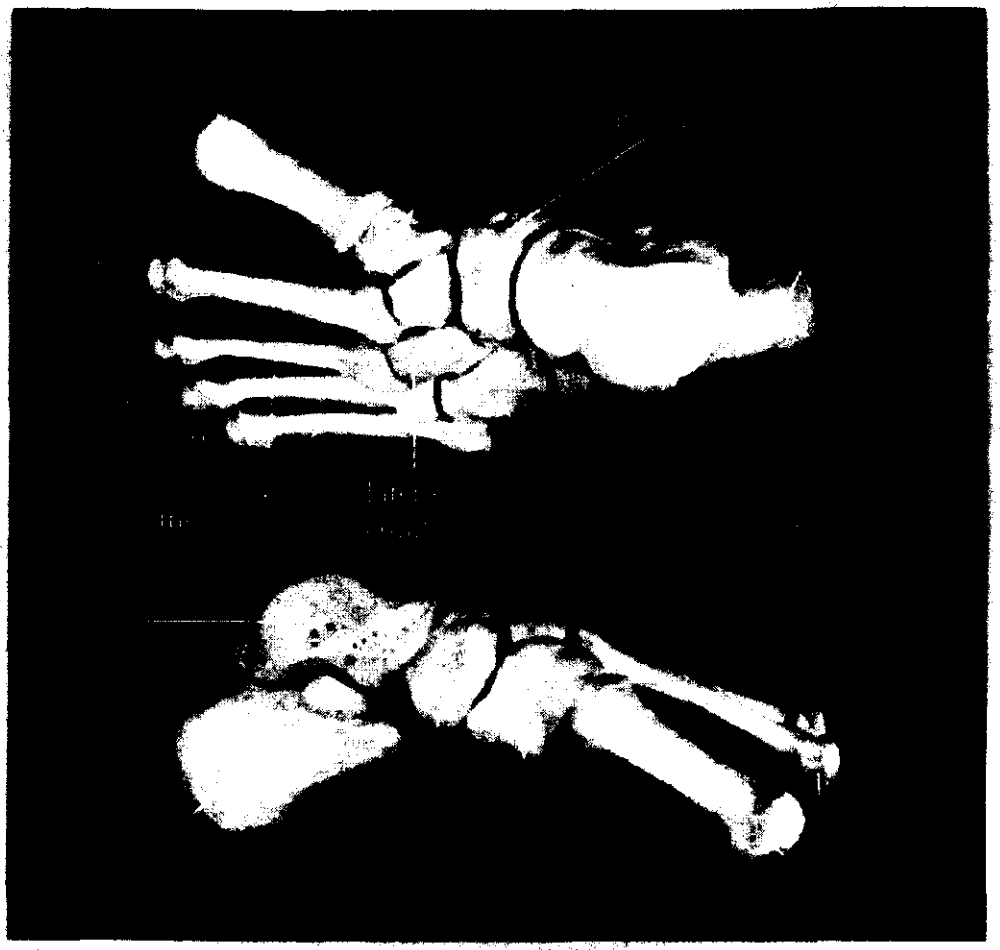


Figure 53. Superior and medial views of the tarsal and metatarsal bones of the left foot.

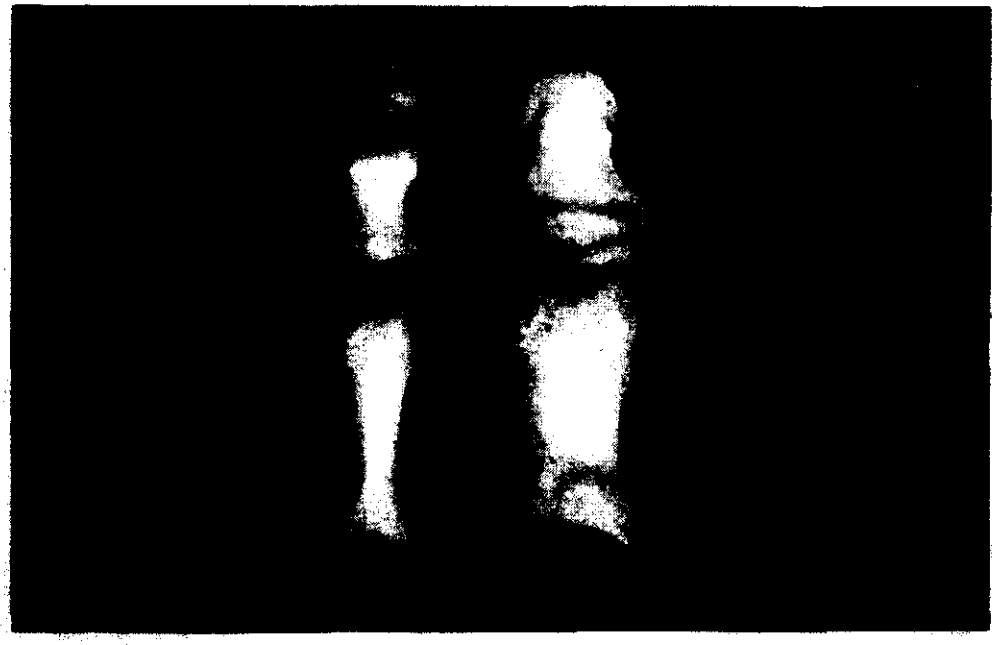


Figure 54. Superior view of the phalanges for the first and second toes.

Healthy Bodies Unit Culmination Project

This project can be done individually or in groups.

The Human Body Corporation

Description:

As a body organ, you are an employee of the Human Body Corporation. Due to recent cost increases, the Human Body has to fire workers. You need to write a letter to the Human Body Corporation defending your position in the company. In your letter, you need to describe to the corporation the following characteristics of your organ and explain why you are important to the Human Body Corporation.

1. Tell what the name of your organ is and where you are located.

2. Identify what systems of the body you work with.

3. Describe how you work with these systems.

4. List the other organs that work with you in your system.

5. Describe your main functions as a Human Body organ.

6. Tell the corporation how you perform these functions.

7. Tell the corporation why you are important and why they should not fire you.

8. Explain what might happen to the Human Body Corporation if they fired you.

9. You will read your letter to the Human Body Committee (the rest of the class). Along with your letter, you will need to have a photograph (labeled drawing) of your organ to use as a visual aid.

Reflections on Teaching

After teaching our lessons, we reviewed the videotape and critiqued each other and our selves. We were looking for positive and negative aspects, things to do differently, teaching styles, and personal idiosyncrasies.

Videotape Analysis and Reflection
Self-Analysis

The experience of video taping was eye opening. Both while being taped and watching the tape, I was very conscious of my body movements and voice variations. During my lesson on the Digestive System in the fifth grade classroom where I taught, I was able to observe my personal idiosyncrasies, and I have decided on some ways that I might adjust them. The first tendency I have is to ring my hands. While I am waiting for an answer or while I am trying to approach a topic from a different angle that the students might more easily understand I appear to be nervous. I know that when I am in my own classroom I will be more comfortable with students' abilities and I will be able to adjust to their needs and I will feel less pressured to think on my feet with little background to base my adjustments on. I also say, "Okay," very often. I think that as my mind is moving to the next thing that I want to say I fill the quite space with the meaningless word. I will fix this with preparation. I have spoken with teachers and they encouraged me to keep working at it because fluency and confidence builds as teachers teach longer and know the content more completely. Another distracting tendency that I possess is putting my hands by my mouth and face. I touch my upper lip and if the students are looking at me I am sure that this is a distraction. A way that I might be able to solve this is to be holding a manipulative or object that applies to the lesson. My hands did calm as I held the materials and was able to point and show.

My voice remained fairly steady. I laugh nervously at times and I think I tried to compensate for noise and chatter by raising my voice. The students were very attentive, but there were so many of them that there was naturally some noise. I think the students felt like they were able to answer questions without being afraid to make a mistake. I did

smile often, and they all smiled back. They were sensitive to my nerves and they listened very well. I did feel that I was loud enough to be heard in the very large room. If I could have changed anything it would have been the set up of the room. The desks were completely packed in and I had to alter my plans a little because the students could not get in and out of their seats easily. I believe there were over 40 students in the room while I was teaching and I know that this is not typical. I would have liked to have the opportunity to get a larger percentage of the students more actively involved.

The questions that I did ask did not require the students to think at a very complicated level. If I had the opportunity to do this again with a fifth grade class I think I might have structured it so that the students would have been analyzing and comparing and contrasting more than simply regurgitating information. The students were able to answer the basic knowledge questions that I asked. Nearly all of the students volunteered to answer, and even if the student would give an incorrect response I was able to connect something they said toward the correct answer. I feel that it is important to give the students security so they will continue to try and find the correct answer even if they did not quite get it on the first try.

There were so many students to choose from I do not think that I called on anyone more than once. I have twin brothers in the class that I was teaching and I did call on one of them twice, but I think part of the reason for that might have been because I knew his name, and I did not know anyone else's name. The students all participated wonderfully and I always had volunteers to choose from. At times, I know that if it had been my classroom I would have picked the students without their hands raised to make sure they were paying attention, but I did not want the students to feel intimidated during the lesson

or pressured. I did give ample opportunity for the students to think about answers and when I called on a student I remembered to give the appropriate wait time before asking someone else or answering the question myself.

I was please with how the lesson progressed, especially in the conditions of an overcrowded classroom, unfamiliar students, and a disconnected topic. I was pleased with my visual aides and the students enjoyed becoming the Digestive System. I think the hands on was beneficial for students who are visual, auditory, and kinesthetic learners. I would like to see improvement in question depth. I was unsure of what the students already knew, and therefore I used a lot of knowledge level questions. In a fifth grade classroom, the students should be looking at higher levels. I also need to work on the fluency of my lessons. I work so hard to stay on track during the lesson that when a teachable moment came up I did not take advantage of it. I believe that if I continue to work on these things and practice, I will be prepared for a teaching position where I can use my creativity to guide students learning and discovery.

Nikki-Reflection on Abby

Abby chose a very challenging lesson to do with the fifth grade class. She chose a lesson on the digestive system. She did a great job of getting the students attention at the beginning of the lesson by asking how long digestion takes. The students were very interested by this. She made a great connection to the students by asking what they had for lunch the day before. The questions that Abby asked were very appropriate for the age of these students. It may have been helpful to give a little more wait time before prompting an answer. Her enthusiasm was apparent through her voice inflection. Abby used great visuals of the digestions system so that the students could see exactly what she was talking about. After her activity of the students becoming the digestive system, she did a great job of reinforcing the learning by having each "part" of the system stand up and state the function.

This was a very effective lesson, however there were some minor changes that could be helpful when taught the second time. The string that was used to show students how long the digestive tract was, got knotted up. It was a great idea, but maybe wrapping it up more carefully could have helped. Grouping the student became a little chaotic. It would help to have a more efficient way of putting the students into their groups. Finally, when directions were given for the activity, many students were not paying attention. It would have been more effective to have all of the students' attention and model more extensively for an activity like this.

Video Tape Analysis and Reflection
Honors Thesis

Lesson: Digestive System
Teacher: Abby Schortgen
Grade: 5

The mood for the lesson was set right away when Miss Schortgen asked the class what they had eaten for lunch that day. She then asked them if they could remember what they had eaten for lunch the previous day. Through these questions I think that Abby got the attention of the students and made them curious as to what they were going to be learning about. She then began to ask a few more questions hinting at what the topic of the lesson that day was going to be (ex: " How long do you thing it takes for your food to digest?"). I do not think that I would have changed anything about her opening, it was done very nicely.

Throughout the lesson, Abby asked many questions of the students. The level of the questions was quite appropriate for the age group. The majority of these questions were open-ended so that the students would be required to give more than a simple "yes" or "no" answer. Many of these questions challenged the students to think a little deeper rather than just a regurgitating answer of previously heard information.

The wait time for student response to questions was good during most of the lesson. There were a few areas where more time could have been given for the students to think about the answer instead of going ahead and answering the question for them. Overall, however, I think that Abby did a very good job of allowing enough time for students to process the question and give and acceptable answer.

All of the students in the class seemed to enjoy this lesson very much. They were engaged in the lesson through active participation, answering/asking questions and simulating what happens to food as it goes through the digestive system. All students that had something to

say during the lesson were called on. It was evident that Miss Schortgen has no equity issues and does not show favoritism.

As a teacher I think that Abby has a lot of strengths. For one, this was an excellent well put together lesson. It was age appropriate and required active participation from all of students. She used wonderful visuals to enhance the information that she was sharing with the students. One example of this is Miss Schortgen's use of yarn to show the students exactly how long their digestive tract is inside of their bodies. Without this visual the information would have been just another fact given to the students. However, through this visual the students were able to see and gain greater comprehension of the information given. The hands-on activity for the students was also very well done. The students simulated what actually happens as food travels through the digestive system. Each student was a specific part of the system and had to learn what their function was. After the activity the students shared what part of the system they had been and what they were required to do to make the digestive system work.

In spite of the many successes, there were also some areas that could use improvement. As previously mentioned wait time for student response could have been better. Another thing that would have been helpful for this lesson would have been to have a sheet with a brief outline of the material that that was going to be covered. All of the information in the lesson was given verbally. There were a good deal of new vocabulary words that went along with this lesson as well and it would have been beneficial for students to have a sheet with the words defined on it. One last thing that I feel could have been done better was the splitting of the class into groups. There was a small period of disorder and confusion as the students tried to split themselves up. It would have been much easier to have the students number off or go by groups so that there would have been less noise and commotion.

Video Tape Analysis and Reflection
Honors Thesis

Lesson: Skeletal System
Teacher: April Kuehnert
Grade: 2

In order to draw the students into the lesson right away I used a blob of play dough with eyes. I asked the students to tell me what they thought this play dough might represent. From the get go the students were interested and curious about what they were going to be learning. The visual was meant to represent a person without any bones. One student was successful in guessing this. I think this introduction was a great way to hook the students and get their minds in gear to learn. Looking back I don't think that there was anything that I could have done differently to make the introduction go any better than it did.

The transition from the introduction to the lesson went fairly smoothly. The only hang-up was trying to get the over-head projector turned on. I think it would have been beneficial if I had gotten that set up before beginning the lesson. However, after I got the over-head taken care of things were fine. The over-head of the bone seemed to help the students a great deal. They were able to look at something concrete while listening to the information and answering questions. I used a variety of questions throughout the lesson hitting both ends of the spectrum. When the students had difficulty with a particular question I would give them a small hint to guide them instead of simply answering the question for them. Many of the questions were open-ended to see exactly what the students knew and whether they were paying attention during the lesson (What happens in the compact bone? What three things are made in the spongy bone?).

During the lesson I tried to give the students an adequate amount of time to think about and answer the questions that were asked before giving hints or answers. Overall I think I did a good job of this. If the students had a difficult time answering I praised them for their effort and then asked if there were any students who could "help" the student answer the question. I also tried to use simple hints to guide the students toward the answer when the questions were not easy for them. If the entire class had a particularly difficult time in answering a specific question I would make sure to take extra time and explain the answer.

All of the students were actively involved in this lesson through answering questions, creating their own "bone", and asking questions about the real bones they were able to view. All students that desired to speak were called on at some point during the lesson. I did not notice any equity issues on my part or see that I showed favoritism to any particular student. Each student in the class was able to create a replica of a bone within their body. The bone had three different layers which students labeled and colored appropriately according to the models shown to them during the lesson. Students were also able to come and see and touch some real bones that were brought in. Through this activity students were able to have a 3D visual instead of a simple picture on a sheet of paper. I think it made the experience a great deal more real for them.

I did notice a few weaknesses in my teaching of the lesson and things that I would do differently if I were to teach this lesson again. Although my wait time for student response is usually pretty good, there were some times when I feel I didn't wait long enough for a student response. That is something that I would like to work on being more consistent with. Another thing that would have been helpful during this lesson

would have been to use dry erase markers on the overheads and have students come up and color in the various parts of the bone that we studied. The way it was done in the lesson the students had to remember everything as it was taught. I think it would have been very beneficial to the students if they had that visual to look back on when they were doing the bone project later. One other thing that I noticed was that I was too vague in my directions that I gave the students for the bone project. When asked where to write the label for each bone I told them they could put it wherever they wanted. Looking back I can see that this caused a little confusion for the students because they were unsure.

There were also many strengths displayed while teaching the lesson. At the beginning of the lesson I used the analogy of the bone being like a Tootsie Pop or Blow Pop, having the hard outer covering and the softer center. I think the students gained a greater understanding about the make-up of the bone because they could compare it to something they were quite familiar with. I also had a good review with the students close to the end of the lesson. After they had finished creating their bones we went through a lot of the information they had been taught. I think this was very helpful in acquiring that final understanding of the bone structure. I also modeled difficult words on the board, explaining each one as we went along. This way when the students had to label their bones later they would have a reference to look back on for correct spelling.

Overall I think the lesson was a success and I was very pleased with the student interaction and participation. They were very receptive and seemed to have enjoyed the lesson and the activities very much.

Nikki-Reflection on April

April taught a lesson about bones to a second grade class. She had a great introduction that grabbed the students' attention. They were very curious to know what her "green blob" was supposed to represent. Throughout the lesson, April did a great job of comparing components of a bone to something that the students could relate to. This is a great way to get the students to make connections. She had very appropriate questions after a concept to check for the students' understanding. They wait time on the questions was inconsistent. Sometimes she gave a good amount of time for students to think, while other times she rushed them a little. After the students completed an activity where they constructed a bone, April did a great job of reinforcing what was just done by asking students to recall the parts and functions of the bone.

There are some things that could be beneficial for April to look at when preparing to teach this lesson next time. The visuals on the over-head were very good materials, but it would have been helpful to the students if there were labels for them to refer to. I noticed while she was talking she said "feets," instead of "feet," which probably had more to do with nerves that anything else. Finally, it may have been better for the students if there was a more extensive closure to the lesson. It came to sort of an abrupt end, and a few more questions asked could have made the ending smoother.

Video Tape Analysis and Reflection
Peer Evaluation

While analyzing the group members' lesson plans I recognized many areas that I should consider while I am teaching. I noted things that I would like to try as well as things that I need to look at and make sure that they are creating the best possible learning opportunities for each student in the class. The accommodations that were made, if any were at the very last minute because we stepped into these classrooms not knowing any of the students and without them knowing us. The preparation that it took for these was great because we were unsure of the level of knowledge that the students had already received.

Mood is an important factor in the delivery of a lesson and the success in motivating the students to want to learn. Immediately when April entered the room I think the students felt comfortable and were eager to see what was coming. She accomplished this with a smile and an open mind when students' answers would not be quite what she wanted. April did her best to encourage the students to at least try to answer the question and she gave many different students the opportunity to answer. Before she told the students something she asked for students who might already have the information. This was effective because it gave other students a resource if they did not understand.

The questions that April posed to the students started with simple knowledge based questions, except for the motivational "green blob", where she encouraged creativity. April asked questions where the students had to supply important information, and she included repetition that would ensure retention of the knowledge. Toward the end of the lesson presentation however, April was able to raise the level of questions,

especially when she was talking about how to keep one's bones healthy. Also when April showed the actual bones, she brought the group back together and talked about how that bone is similar to the one inside of a human. She and the students compared the cow's bones with what the students thought a human bone might look like.

Each of the students had the opportunity to be involved. Again, without knowing the students it was difficult to completely regulate it. She did not discriminate between girl and boy students, and she took volunteers from each area in the room. Also, in the small groups that explored the bones, the students had an opportunity to ask their own questions and discuss the bones with them directly in front of them.

April's used auditory, visual, and kinesthetic presentations of the material. She lectured and gave the information on an overhead first, and then the students were allowed to touch and explore the real bones. This is important because the students do not all learn in the same way and it is important to give opportunity to as many students as is possible. The ability to integrate multiple learning styles into a lesson reaches more students and gives more opportunities to learn.

Finally, the areas that could be adjusted to be more effective would be the circulation of the teacher while the students are working. The students worked on a simple creative project to illustrate what they had learned, and while they were working the teachers were watching, but there was very little interaction. I think this would have been a good time to go to individual students and/or the small groups that they were sitting in and discuss again what they were making and reemphasize the importance of it. Aside from this fairly uncontrollable weakness, in our situation, April taught and excellent lesson.

Nikki-Self-Reflection

Looking back on myself teaching a lesson on bones, there were many things that I would change if I were to do it again. One thing that I noticed was that I said "OK" too much. I made it sound like I was asking the students permission, instead of having a better way to ask if they were following what I was doing. It would have been much better to have asked if there were any questions, or ask questions in order to check for understanding. I did not notice a lot of changes in my speed and voice while I was talking to the students. It may have been more effective if I had change the tone, pitch and volume at various points in the lesson.

The beginning activity was much too simple for fourth graders. They guessed very quickly what the "blob of clay" was supposed to represent. Instead of only having transparencies for students to look at, it would have been helpful for each of them to have had a reference sheet of their own. Prior to teaching this lesson, I had not had a lot of experience with fourth graders, and it would have been much more beneficial to them if I had more age appropriate activities. The lesson would have been much better if I had a way to assess prior knowledge before teaching the lesson. Finally, while some students were examining the bones at a different table, there should have been an activity planned for those students sitting at their seats. This became a waste of time for those students.

Although there were many things that I would change, some things were very well. I had many different examples of bones, which gave the students a broad view. I knew the information very well, and was able to thoroughly answer student questions. Finally, while students were working on one activity, I set up the next activity which was a good use of time.

It was very helpful for me to reflect on this lesson, because not only did I find areas that needed improvement, but I was also able to pick out my strength areas as well. It was very helpful when revising the lesson plan. I also learned how important it is to adapt all parts of lessons (activities, questions, materials, etc.) for different grades and ability levels.

Video Tape Analysis and Reflection
Peer Reflection

Nikki taught the same lesson as April, but she taught it in fourth grade. While watching this lesson over again, it was another great opportunity for me to consider my teaching styles and techniques. Nikki's presentation was very thorough and she made great alterations to the lesson plan based on the students' existing knowledge. The challenge of teaching these lessons was that we did not know what the students had already experienced before we arrived. Our planning had to be thorough and complete because we had to make adjustments to more complex or simpler ideas depending on what the students knew. I think Nikki did an excellent job realizing that the students already possessed a lot of knowledge on the subject of bones, and she expanded her teaching to challenge the students.

The lesson began again with the green blob. This motivation worked in both settings because it was funny and caught the students' attention. The mood was immediately established, and the students knew what they were going to learn about and that it was going to be a relaxed and fun learning experience. I think this was effective for Nikki because it might have taken some pressure off of the students as they decided whether or not they wanted to participate.

A lot of the material that Nikki discussed was review for these students so it was almost like a mini lesson, and then the students got to experience the bones. The questions that Nikki asked were not solely from the knowledge bracket of Bloom's Taxonomy. She went farther to challenge the students to explain, "Why?" and, "How?" The students also asked some great questions and she discussed some of the answers, but

then she put the responsibility back on the class to see what they could come up with. She was not afraid to address topics that came up during the lesson that she had not necessarily planned for.

All of the students were engaged and involved in learning. She chose a good variety of student volunteers and gave them adequate time to give an answer. Nikki did not cause the students who "forgot" or incorrectly answered questions to be embarrassed, so they continued to attempt to find an answer and did not simply give up. This is an important technique to make the students feel secure enough in the classroom environment to make mistakes because that is sometimes how a teacher recognizes misconceptions and addresses re-teaching.

I think Nikki's strength was in the presentation of her material. She had excellent visuals for the overhead that all of the students could see, and the students loved being able to touch and explore the bones that she brought in. I think the pictures and bones are what is going to make the information stick for a lot of the students, especially those who learn visually and kinesthetically. The activity at the end where the students made their own little study tool was also giving the students a resource for their own reminder.

The challenge with these lessons is that we, the teachers, were not familiar with the students and what they knew. I know that this is not necessarily an issue in one's own classroom, but I think that our planning for Nikki's lesson could have been enriched by knowledge of the students. Aside from that fact, which was fairly uncontrollable, Nikki taught an excellent lesson.

Video Tape Analysis and Reflection
Honors Thesis

Lesson: Skeletal System
Teacher: Nikki Dammeier
Grade: 4

To draw the students into this lesson right away Miss Dammeier used the visual of a blob of play dough with eyes on it. The visual was meant to represent a person without bones in their body. The students had a fun time trying to guess what the blob was supposed to be. This activity intrigued the students and got them interested in seeing what was coming next. Nikki also had a very smooth transition from the introduction into the heart of the lesson giving students a brief summary of what they would be discussing that day. I don't think that there is anything that I would have done differently here, the introduction was done very well.

Getting into the lesson Nikki had good use of overheads to visually show the information that she was teaching. Using the over heads she asked many questions of the students. Not only did she have questions with "right-there" answers, but also many open-ended questions to challenge student thought. Many of these questions were used as a gage to see where the students' knowledge of the subject was (What do you think happens in the bone marrow? What part of the bone is this?). If the question was answered right away the lesson would continue. If, however, there was difficulty in answering the question Miss Dammeier would take time and go into more detail explaining the answer to the students.

Response to student answers and wait time for student response was very good. She would wait several seconds after asking a question to give the students time to think and process the question. She did a good job of realizing when the students weren't

going to get the answer and so answering the question herself. Miss Dammeier also did a good job of prompting and guiding the students toward the right answer. All students were praised for an attempt in answering questions.

Throughout the lesson all of the students are actively participating and had equal opportunities to answer questions. Students were involved in creating their own "bone", viewing real bones, and answering various questions about the skeletal system and what happens within the bone. There were no signs that Nikki had an equity issues or showed favoritism to any students in particular. She was very fair in calling on students and did her best to pull each individual student into the lesson.

Nikki showed a variety of strengths while teaching this lesson. For one, she showed that she is able to connect with the students through a sense of humor when one child made a comical comment Nikki laughed right along with the students. I think this shows that she is comfortable in front of the students and is not afraid to have a little fun with them. Miss Dammeier also had a good use of visuals to build greater comprehension and understanding from the students. Nikki used the play dough to show what we would look like without bones and also modeled on her own body where many of the bones could be found. She also used the overhead to show the different bones and various parts of them as well as real cow bones (if the students chose to see) so the students could have a real life image of what they were studying. Miss Dammeier also did an excellent job when faced with a difficult question by a student. The student asked if teeth were bones. Nikki gave the best answer she could from her own knowledge but was honest in saying that would be an excellent thing to look up and find more information on.

Though there were many strengths shown through the lesson, there were also some weaknesses. I think that it would have been very beneficial for the students to have had handouts of the information to look at and follow during the lesson. The overhead was very helpful for images, but there was a great deal of vocabulary that was used and probably would have been better retained had there been printed handouts. Also, during the time when the students were taking turns looking the cow bones, the students that were not looking at the bones had nothing specific that they were to be doing. This could have been a potential problem, though nothing happened. It would have been good to have something for the students to be working on during this time to keep them occupied.